THE DOCK & HARBOUR AUTHORITY

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Editorial

Southampton Graving Dock.

Excellent progress continues to be made with the new graving dock, and during May the huge steel caisson which will be used to close the entrance to the dock will be fitted.

The caisson, which is 141-ft. in length, 29-ft. wide and 58-ft. in depth, was launched in April at Haverton-on-Tees by Mrs. Wentworth-Sheilds, wife of Mr. F. E. Wentworth-Sheilds, O.B.E., Docks Engineer to the Southern Railway, and will be towed to Southampton. When completely equipped it will weigh 1,850 tons, and the gross weight, including water ballast, will be 4,600 tons.

The caisson will be moved to or from the entrance of the graving dock by means of electric power, and when a vessel is entering or leaving the dock the "gate" will be accommodated in a recess at right angles to the length of the dock. Great accuracy has been demanded in the construction of the "gate," for one of the stipulations in the contract was that it should not permit the passage into the dock when closed of more than five tons of water per hour. The sides and bottom of the caisson are faced with greenheart, which was finished with such care that the maximum gauge between the "gate" and the walls of the recess will not exceed four one-thousandths of an inch.

Annual Report of Vancouver Harbour Commissioners.

The Vancouver Harbour Commissioners, in their annual report for 1932, which has been received at Canada House, Trafalgar Square, London, S.W.1, shows that exports of grain last year were in excess of those for any corresponding period in the history of the port, being practically double those for 1931. The total exports of Canadian-grown grain in 1932 were 105,006,925 bushels, as compared with 70,841,445 bushels in 1931.

On the waterfront there are now seven grain elevators with a total storage capacity of 17,843,000 bushels, in addition to domestic storage of 625,000 bushels; together with nineteen grain-loading ships' berths. Ships can now be loaded with grain at the same pier at which they discharge and load general cargo. The port is now served by twenty-one deep-sea steamship lines to Great Britain and European ports, and a further thirty lines to the Far East, Australasia, United States Atlantic ports, South America, South Africa, etc., as well as fifteen other lines serving nearer North American ports.

A total of 15,981 vessels of all classes entered the port during the past year with a net tonnage of 11,082,902 tons. Deep-sea vessels numbered 1,123, with a net tonnage of 4,501,754. Exports aggregated 4,363,090 tons, whilst the total imports handled were 2,862,765 tons.

Exports of lumber and logs totalled 213,573,796 b.m.; together with 42,209 tons of newsprint or Kraft paper or pulp; 915,753 cases of canned salmon; and other Pacific Coast products. A total of 82,279 bales of raw silk passed through Vancouver last year.

The report contains many interesting data relative to developments during the year by the Harbour Commissioners or by railway and private interests in the port.

Official Opening of Bidston Dock.

Bidston Dock, Birkenhead, was officially opened on Friday, April 28th, though it has been in actual commission for several weeks. The dock is an important addition to the Birkenhead dock system. It has been constructed on the site of the old Wallasey Pool. Originally it was to be 1,600-ft. in length and about 500-ft. wide, but owing to the Government's economy move it was decided to reduce the cost from £913,000 to £708,000 by confining it to 1,000-ft. in length. The dock can be lengthened at any time by the removal of the embankment at one of the extremities and the preparation of the ground. Entrance is given from the West Float and other docks at Birkenhead by a passage 100-ft. wide, with never less than 30-ft. of water on its sill. The quays have been levelled and made ready for either transit or storage sheds with up-to-date dockside cargo-handling appliances, and the area of land remaining available for the construction of mills, factories, warehouses and the like, every part of which can be readily connected by rail with the principal main lines, is about 80 acres.

On the site of Bidston Moss, at the extreme west end of the Birkenhead dock system, the Dock Board has about 160 acres which is now in the course of development. The Board has planned a dock more than half-a-mile in length, with a mean width of 400-ft., running from end to end of the site in an East and West direction, with room for arms or branches should such be found desirable, reserving an area of about 70 acres for quays, sheds, roadways, and general dock purposes. It is the first instalment of the projected dock that has just been completed and brought into commission. It has a water area of nearly 11 acres, and two straight quays each 1,000-ft. in length, with two shorter quays suitable for small craft.

Modernisation of Coaling Appliances at Hull.

The modernisation of the coaling appliances to enable them to deal with 20-ton wagons is proceeding apace at Hull, and is being extended to the smaller docks devoted to the near Continental trades. At the Humber Dock, for example, a new hydraulic hoist with this capacity has just been completed. It has a raising height of 58-ft. above quay level, sufficient for tipping maximum sized wagons with end doors at the highest point of the chute, and can also be used for wagons with bottom doors. The speed of lifting a wagon weighing 10 tons with a load of 20 tons is 120-ft. per minute. At the Alexandra Dock electric cranes with a high reach for the better handling of general merchandise are being installed, and other minor improvements are in progress.

Increase in Port Dues collected on the Forth.

According to reports submitted at the annual meeting of the Forth Conservancy Board—recently held in Edinburgh under the chairmanship of the Earl of Elgin—dues collected during last year showed a slight increase upon those of the previous years. The total tonnage "in and out" of vessels using the ports of Alloa, Bo'ness, Charlestown, Grangemouth, and South Alloa (upon which dues had been paid last year) was 1,525,004 tons as compared with 1,399,549 tons the previous year. Shipping, it was stated, was still in a very depressed condition. A considerable sum has been spent during the year in carrying out repairs on Stirling Harbour and upon lighting and buoying. The annual refit of the light buoys and sound signals had been carried out during the year, and at the annual inspection had been found to be in a satisfactory condition. The fog signals had functioned efficiently, and during November (when there was a lengthy period of dense fog) the navigation of the river between Grangemouth and Beamer Rock presented no difficulty.

It was further reported at this meeting of the Forth Conservancy Board that the work performed during the past year in connection with the survey of the river bed had not revealed any vital changes affecting the navigation. Between Kincardine and Alloa, however, where instability was to be expected, the shoal banks had slightly altered. The reclamation of land at Kinneil was progressing slowly. In the north section of the eastern lagoon an area of ten acres had already been gained at a height of twelve feet, and the remaining three acres would be completed shortly. The southern section of about fifty acres retained by the north and south bank was partly dry, and it was thought that a portion might be made available for use at an early date for the cultivation of suitable grass. Siltation continued to be satisfactory in the large eastern lagoon. The usual routine work was improving the amenities of the river, and checking oil pollution, and the control of small craft using the river had been efficiently carried out.

The Port of New York

Latest Data issued by the Bureau of Commerce

The Port Authority Moves to New Quarters.

THE offices of the Port of New York Authority were moved from their old location to the new Port Authority Commerce Building during the latter part of April. The new address is 111 Eighth Avenue.

The Port Authority occupies the fifteenth storey of its new building, which also houses the Union Inland Freight Station No. 1, and occupies the square block bounded by Eighth and Ninth Avenues and 15th and 16th Streets.

New York: A Distribution Point for Imports.

The United States Department of Commerce statistics for the calendar year of 1932 shows the Port of New York to have been the gateway for 49.6 per cent. of the import trade of the United States. Part of the $656,000,000 of imports passed into the interior of the United States over the network of railroads, coastwise, inland waterway, motor truck, and air lines which radiate from the Port of New York. A large part, however, was consumed locally in the Metropolitan area.

Approximately 11,000,000 people live in the Metropolitan area surrounding the port and many consumers living outside thereof trade in its numerous stores. A recent publication of the Census Bureau of the United States Department of Commerce shows 103,623 retail stores in New York City and 38,313 in the six Metropolitan counties of New Jersey, having combined net sales for 1929 aggregating $5,657,000,000. This market outlet is even larger if Westchester, Nassau, Rockland, and other counties in New York, New Jersey and Connecticut, usually considered as part of the Metropolitan District, are included.

The 1929 census reported 2,600 hardware stores carrying tools, cutlery, nails, screws, etc. Imports in the Port of New York of these articles in 1931 reached a value of $1,295,000.

Furrier shops numbered more than 500. A large portion of the imports of furs, reported at $46,861,000 in 1931, found an outlet through these shops.

There are more than 4,000 drygoods stores in the district. Imports of textiles in 1931 included: cotton goods and manufactures — $30,846,000; flax, hemp and ramie goods — $23,998,000; mohair and wool fabrics and wearing apparel— $7,564,000; silk fabrics and manufactures—$13,691,000.

In addition to the specialty shops, there are more than 100 department stores, over 600 five and ten cent stores, 800 gift shops, all dealing in miscellaneous goods of many descriptions, many of them of imported origin.

The concentration of population and distribution outlets in the Port of New York offers not only a favourable market for importers, but also a much larger market for domestic manufacturers. The American exporter finds it to his advantage to ship *via* the Port of New York because of the domestic outlet afforded in the Metropolitan area, permitting him to vary his distribution with the changes in demand between the foreign and domestic market.

Value of Foreign Trade at the Port of New York.

The value of foreign trade at the Port of New York in the month of January, 1933, was 4 per cent. lower than in the previous month, and 20 per cent. less than in the corresponding period a year ago. Exports amounted to $38,168,000 as compared with $44,385,000 in January, 1932, a difference of 14 per cent., while imports were $49,267,000 as against $65,115,000 a year ago, a drop of 24 per cent.

	January		Net Change	
	1933 $	1932 $	Amount $	Per Cent.
Exports	38,168,000	44,385,000	-6,217,000	—14·0
Imports	49,267,000	65,115,000	—15,848,000	—24·3
Exports and Imports	87,435,000	109,500,000	—22,065,000	—20·1

Vessel Movements in Foreign Trade.

The number of entrances of vessels in foreign trade at the Port of New York in February were 18 per cent. under the corresponding month last year, while the number of vessels clearing from the port to foreign countries were 11 per cent. less.

	February		Net Change	
	1933	1932	Amount	Per Cent.
Entrances, No. of Vessels ...	380	464	—84	—18·1
Clearances, No. of Vessels ...	403	454	—51	—11·2
Entrances, Net. Reg. Tonnage	2,055,065	2,366,654	—311,589	—13·2
Clearances, Net. Reg. Tonnage	2,137,773	2,287,879	—150,106	— 6·6

The entrances included 35 vessels in ballast, 73 with bulk cargo, and 272 with general cargo, while the clearances consisted of 88 in ballast, 11 with bulk cargo, and 304 with general cargo.

Commerce at Port Newark.

While the volume of waterborne receipts at Port Newark in February, 1933, was not as great as in the previous month, it was larger than in the same month last year. The total receipts by steamer and lighter amounted to 45,647 tons as compared with 41,213 tons in February, 1932, a gain of 11 per cent. Forty steamers arrived during the month, as against 26 a year ago.

Receipts of lumber amounting to 11,277,000 board feet were only slightly less than in the previous month, but were 27 per cent. less than the February, 1932, figure of 15,805,000 board feet. Shipments of lumber inland were 11,295,000 board feet, of which 5,970,000 feet moved by railroad car, and 5,325,000 feet moved by truck.

Cargo other than lumber unloaded from steamers and lighters at Port Newark was 28,731 tons, a gain of 64 per cent. over the February, 1932, figure of 17,505 tons. These receipts this year included 5,468 tons of potatoes from Maine.

Water-borne Receipts at Port Newark.

	February		Net Change	
	1933	1932	Amount	Per Cent.
All Commodities (tons)...	45,647	41,213	+4,434	+10·8
Lumber (board feet) ...	11,277,000	15,805,000	—4,528,000	—28·6
Other than lumber (tons)	28,731	17,505	+11,226	+64·1

Steamship Passenger Traffic.

During the calendar year 1932, the steamship lines in foreign service landed and embarked 779,865 citizens of the United States and aliens at the Port of New York. This movement was at its peak during September, for which month a total of 119,817 passengers was reported. February was the lowest month of the year with only 36,921 passengers carried.

Comparing the total traffic for 1932 with the year before, the decrease was not so great as that of 1931 from 1930. While 1,124,827 passengers were carried in and out of this port in 1930, a total of 871,511 was reported for the year 1931, a decline of 253,316 passengers. The decline from 1931 to 1932 was 91,646 passengers.

It is interesting to note that only 16,598 immigrants arrived here last year, while at the same time 55,022 emigrants sailed abroad to make a new home for themselves in a foreign country. The total number of outbound passengers exceeded the inbound movement by 101,239, of which 28,649 were U.S. citizens and the balance aliens.

A comparison of this traffic with 1931 is as follows:—

	Year 1932	Year 1931
INBOUND—		
Aliens, Immigrant	16,598	26,860
Aliens, Non-Immigrant ...	90,204	104,232
U.S. Citizens	232,511	264,852
Total	339,313	395,944
OUTBOUND—		
Aliens, Emigrant	55,022	46,512
Aliens, Non-Emigrant ...	124,370	147,975
U.S. Citizens	261,160	281,080
Total	440,552	475,567
Total Inbound and Outbound	779,865	871,511

Passenger traffic for the month of January indicates almost twice as many departures as arrivals, which latter includes only 868 immigrants, or the smallest number admitted at this port since entrance records were established by the Bureau of Immigration.

A comparison with January, 1932, is reported below:—

	January 1933	January 1932
INBOUND—		
Aliens, Immigrant	868	1,309
Aliens, Non-Immigrant ...	4,218	4,309
U.S. Citizens	8,278	9,343
Total	13,364	14,961
OUTBOUND—		
Aliens, Emigrant	3,467	4,108
Aliens, Non-Emigrant ...	8,918	10,590
U.S. Citizens	13,162	14,889
Total	25,547	29,587
Total Inbound and Outbound	38,911	44,548

The Port of New York—continued

Passenger traffic by vessel between the Port of New York and United States ports on the Atlantic, Gulf, and Pacific coasts, including Long Island Sound and Hudson River points, amounted to 854,003 persons in 1932. This was a decline of 224,963 passengers from the 1,078,966 reported to the Port Authority for the year 1931.

These figures cover through traffic only, and do not include one-day excursionists travelling to nearby points on Long Island Sound or nearby Hudson River points.

Steamship Sailings.

The number of steamship sailings from the Port of New York continues its downward trend and each month shows substantial declines under last year.

Direct sailings in foreign service numbered 256 in February compared to 292 reported for that month a year ago.

The Intercoastal Lines have made little or no reduction in their direct service to the Pacific Coast, and scheduled 25 sailings in February, which is the same number that was reported last year for that period.

The general cargo carriers in the Atlantic and Gulf coastal trades are also maintaining their service on the same basis as a year ago.

Saturday, February 18th, was the peak day of the month, with a total of 59 sailings. Of this number, 30 were in foreign service and included 2 to the United Kingdom, 4 to European Atlantic ports, 1 to Italy, 1 to South Africa, 2 to the River Plate, 2 to the Far East, 8 to the Caribbean-Mexican ports, 4 Foreign Cruises and 2 tankers. The 29 domestic sailings included 3 to the Pacific Coast, 7 to Atlantic and Gulf ports, 1 tanker and 3 coal carriers.

Vessel Tonnage at Principal World Ports.

A comparison of the net registered tonnage of vessel arrivals in foreign trade at the principal world ports indicates that the Port of New York continues to hold the lead. The tonnage declined at all ports in 1931 and 1932, with the exception of Marseilles which registered a gain of 2 per cent. in 1931. The figures for this port, however, include only vessels with cargo.

Net Registered Tonnage of Foreign Trade Arrivals at Principal World Ports

	1931		1932	
	Net Register Tons	Annual Change Per cent.	Net Register Tons	Annual Change Per cent.
New York	29,417,000	—5·6	26,647,000	—9·4
London	21,624,000	—4·2	20,143,000	—6·9
Hamburg	20,870,000	—7·0	18,253,000	—12·6
Antwerp	19,050,000	—4·9	16,915,000	—11·2
Rotterdam	17,921,000	—12·7	14,938,000	—16·6
Kobe	14,573,000	—4·0	11,987,000	—17·7
*Marseilles	13,838,000	+1·6	13,583,000	—1·9
Liverpool	13,074,000	—8·6	13,035,000	—0·2
Total ...	150,367,000	—5·9	135,501,000	—9·9

*With cargo.

New York State Canal System.

The traffic on the New York State Canal System in the season of 1932 amounted to 3,643,433 tons, being a decrease of 78,579 tons from the previous year, according to the Annual Report of the New York State Department of Public Works. The traffic in 1931 reached a peak for the modern Barge Canal System. A decrease of only 2 per cent. in the severe depression year of 1932 shows that the canal is actually increasing its relative position as a transportation agency.

The east and westbound traffics were nearly in balance, being 1,716,998 and 1,926,435 tons respectively. The more important commodities carried, and their percentages of the whole, were as follows:—

Commodity	Per cent.
Grains (not including flaxseed or flour)	32·0
Petroleum and other oils	27·0
Sugar	11·0
Chemicals, drugs, etc.	4·7
Sand, stone, gravel	3·7
Iron or steel articles	2·6
Sulphur	2·2
Fertilizers	2 0
Pulpwood	1·4
Salt	1·1
Lumber	1·1

Decreases in tonnage were mainly in wheat; iron or steel articles; sand, stone, gravel; barley; sulphur, and pigiron and billets, while increases occurred chiefly in corn; sugar; petroleum and other oils; oats; and rye.

The report of the Superintendent of Public Works compares the trend of traffic on the New York State Barge Canal with that on the Canadian St. Lawrence Canal. The statistics since 1928 show a much more favourable trend in the New York State Canal traffic.

Year	New York State Canal. Tons	Canadian Canal Tons
1928	3,089,998	8,411,542
1929	2,876,160	5,718,651
1930	3,605,457	6,179,023
1931	3,722,012	6,036,980
1932	3,643,433	5,693,800

During the week ending October 29, 1932, the New York State Barge Canal showed an aggregate of 174,099 tons transported, the largest single week in Barge Canal history.

The Commissioner of Canals has announced that the opening date for the 1933 season will be April 5th for the Erie and Oswego branches and somewhat later for the Champlain Branch.

Receipt, Storage and Export of Grain at the Port of New York.

The receipt of grain at the Port of New York continues to be at a standstill. The falling off was 90 per cent. in January as compared with last year, and in February it was 98 per cent. The volume of grain received at the port in February was 65,800 bushels as against 3,055,765 bushels a year ago. This condition will doubtless continue until the terms of the British import regulations regarding the movement of Canadian grain *via* U.S. ports is changed, since about 70 per cent. of the grain shipped from the Port of New York is of Canadian origin. This matter is now under negotiation in London.

The great decrease in receipts of grain is naturally reflected in the volume in store. The visible supply at the Port of New York on March 4th, 1933, was 1,589,000 bushels, a decline of 70 per cent. from the amount on hand at that time a year ago. Wheat and barley figure mainly in the decreased stocks, but holdings of corn and rye are considerably greater than last year.

Visible Supply (Bushels).

	March 4 1933	March 5 1932	Net Change Amount	Net Change Per Cent.
All Grain	1,589,000	5,371,000	—3,782,000	—70·3
Wheat	518,000	5,304,000	—4,786,000	—90·3
Barley	1,000	43,000	—42,000	—97·7
Corn	506,000	1,000	+505,000	+50,500·0
Oats	19,000	20,000	—1,000	—5·0
Rye	545,000	3,000	+542,000	+18,066·7

Exports of grain in the four weeks ending March 18, 1933, amounted to 1,786,000 bushels as compared with 3,602,000 bushels in the same period last year, a decline of 50 per cent. This drop in exports is found to be mainly in domestic grain which fell off from 824,000 to 78,000 bushels, or 90 per cent. Exports of Canadian grain in the period were 1,708,000 bushels as compared with 2,778,000 a year ago, a decline of 38 per cent.

Exports of Grain at Port of New York.

	Four Weeks ending March 18 1933 Bushels	Four Weeks ending March 19 1932 Bushels	Net Change Amount Bushels	Net Change Per Cent.
Domestic and Canadian Grain	1,786,000	3,602,000	—1,816,000	—50·4
Domestic Grain	78,000	824,000	—746,000	—90·5
Canadian Grain	1,708,000	2,778,000	—1,070,000	—38·5

Grain exports out of the Port of New York from the first of the year to March 18, are 32 per cent. behind the volume exported during the same period last year. Exports of domestic grain have fallen off 72 per cent., while Canadian grain in transit was 22 per cent. less.

Channel Improvements.

Improvements of channels in New York Harbour by the United States Government during the fiscal year ended June 30, 1932, represented an expenditure of $4,859,146, according to the annual report of the Chief of Engineers, United States Army. This is an increase of 49 per cent. over the expenditures in the previous year.

The status of work on the more important waterways is as follows:—

Newark Bay, Hackensack and Passaic Rivers.—The existing project provides for a channel in Newark Bay 30-ft. deep and about 1,800-ft. wide at the entrance, narrowing to 400-ft. below the Central Railroad of New Jersey Bridge, and continuing with that width to the junction of Hackensack and Passaic Rivers, with a branch channel 30-ft. deep and 400-ft. wide to the Port Newark Terminal. It also provides for a channel in the Hackensack River with depths of 30-ft. and widths of from 300 to 400-ft. in the lower reaches to a depth of 12-ft. with a width of 150-ft. at Hackensack, and a channel in the Passaic River with depths of from 30-ft. at the entrance to 10-ft. at Passaic, the widths varying from 300 to 150-ft. Expenditures on this project during the fiscal year were $928,082. The project is about 90 per cent. completed.

East River.—This project provides for channels from deep water in Upper Bay to Long Island Sound at Throgs Neck with depths of from 20 to 40-ft. and widths varying from 300 to

The Port of New York—continued

1,000-ft. The project, which is 16 miles long, is now 73 per cent. completed. The depths now available for navigation throughout the waterway in both natural and artificial channels is from 35-ft. in the lower reaches to Old Slip, thence 40-ft. to Hell Gate, and thence from 34½ to 37-ft. to Throgs Neck. Expenditures on this project during the fiscal year were $769,526.

Hudson River.—Work on the pierhead to pierhead channel of 40-ft. depth, which will extend through the entire width of the river between pierhead lines from deep water off Ellis Island in the Upper Bay to a line from Twentieth Street, Manhattan to Newark Street, Hoboken, is now going forward, funds being available to bring it to 80 per cent. of completion. Sea-going hopper dredges were employed during the year in widening the channel from Ellis Island to West Twentieth Street, as well as along the Manhattan waterfront between West Nineteenth Street and West Sixty-first Street. Expenditures on this project during the fiscal year were $399,145.

New York and New Jersey Channels.—This project was completed in September, 1932. There is now available for navigation a channel 30-ft. deep and 400-ft. wide from deep water in Lower New York Bay through Raritan Bay, Arthur Kill, and Kill van Kull to Upper New York Bay. Expenditures on this project during the fiscal year were $611,836.

Bay Ridge and Red Hook Channels.—Sea-going hopper dredges, as well as a dipper dredge and a pipe-line dredge, were employed during the year in this channel which will provide a channel 40-ft. deep from the Narrows to Buttermilk Channel with a width of 1,200-ft. with a widening to 1,750-ft. at the junction of Bay Ridge and Red Hook Channels. The project is about 80 per cent. completed. Expenditures on this project during the fiscal year were $441,400.

The recommended expenditures for channel improvements during the next fiscal year, as compared to those of the fiscal year ending June 30, 1932, are as follows:—

	Amount Expended 1932	Estimated amount to be Expended 1933
Port Chester Harbour	$18,235	$9,976
Mamaroneck Harbour	1,538	—
Westchester Creek	69,717	900
Jamaica Bay	897,070	473,648
Entrance Channels	221,822	13,669
Bay Ridge and Red Hook Channels	441,400	210,290
Buttermilk Channel	4,988	4,991
East River	769,526	651,197
Newtown Creek	144,542	111,390
Harlem River	134,028	8,034
Hudson River Channel	399,145	184,520
Newark Bay, Hackensack and Passaic Rivers	928,082	61,492
New York and New Jersey Channels	611,836	58,157
Raritan River	168,821	—
Washington Canal and South River	48,396	—
	$4,859,146	$1,788,264

Port of London Notes

Retirement of Three Port of London Chiefs.

Three chief officials of the Port of London Authority retired on the 31st March. Mr. M. G. Matthews, O.B.E., relinquished the office of dock and warehouse manager; Mr. J. H. Estill, O.B.E., that of commercial manager, and Mr. H. E. Upton that of treasurer.

Mr. Matthews entered the service of the East and West India Docks Company at the Tilbury Docks over 45 years ago. He was promoted to the Head Office in 1912 and after serving in various capacities was appointed assistant dock and warehouse manager in 1920 and dock and warehouse manager in 1930.

Mr. Estill was with the North Eastern Railway Company for 26 years before the Port Authority appointed him their first commercial superintendent. For a short period during 1917-1918 he held an appointment with the Union Cold Storage Co., Ltd., but returned to the Port Authority as commercial manager.

Mr. Upton commenced his career with the well-known firm of Accountants, Messrs. Price, Waterhouse and Co., and from 1896-1904 was secretary and accountant to the Electric Traction Company, a concern formed to finance the construction of the Central London Railway. From 1904 to 1909 he was assistant accountant to the Great Northern Railway. He was appointed by the Authority to the position of comptroller in 1909 and that of treasurer in 1927.

New Port of London Appointment.

Major Theophilus Williams, M.A. (Cantab.) commenced his duties as dock and traffic manager to the Port of London Authority on the 1st April. The post is a newly created one and combines the former positions of dock and warehouse manager and commercial manager. He joined the staff of the Authority as outdoor assistant to Sir David J. Owen, the general manager, in 1928, and two years later was appointed assistant to the general manager. Major Williams gained his initial experience of port work and administration during the war and was deputy assistant director of docks directorate, G.H.Q., France, 1917-1919.

New P.L.A. Treasurer.

Mr. F. S. Blunt has been appointed treasurer by the Port of London Authority.

Mr. Blunt has been thirty years in the service of the Port and commenced his career with the Thames Conservancy; he transferred to the Port Authority on the formation of that body in 1909.

Tilbury Passenger Landing Stage.

Twenty-four vessels, totalling 240,817 gross register tons, used the Tilbury Passenger Landing Stage during the month of March, 1933.

Altogether 3,045 passengers were embarked or disembarked at the Stage, in addition to baggage and mails.

London's Shipping.

During the week ended March 24th, 779 vessels, representing 820,304 net register tons, exclusive of those in ballast, used the Port of London. 378 vessels (642,072 net register tons) were to and from Empire and Foreign ports, and 401 vessels (178,232 net register tons) were engaged in coastwise traffic.

* * * *

During the week ended April 7th, 950 vessels, representing 888,813 net register tons, exclusive of those in ballast, used the Port of London. 412 vessels (696,815 net register tons) were to and from Empire and Foreign ports and 538 vessels (191,998 net register tons) were engaged in coastwise traffic.

* * * *

During the six days ended April 13th, 1,040 vessels, representing 806,393 net register tons, exclusive of those in ballast, used the Port of London. 384 vessels (628,638 net register tons) were to and from Empire and Foreign ports, and 656 vessels (177,755 net register tons) were engaged in coastwise traffic.

* * * *

During the eight days ended April 21st, 823 vessels, representing 949,202 net register tons, exclusive of those in ballast, used the Port of London. 427 vessels (777,843 net register tons) were to and from Empire and Foreign ports and 396 vessels (171,359 net register tons) were engaged in coastwise traffic.

Manchester Ship Canal.

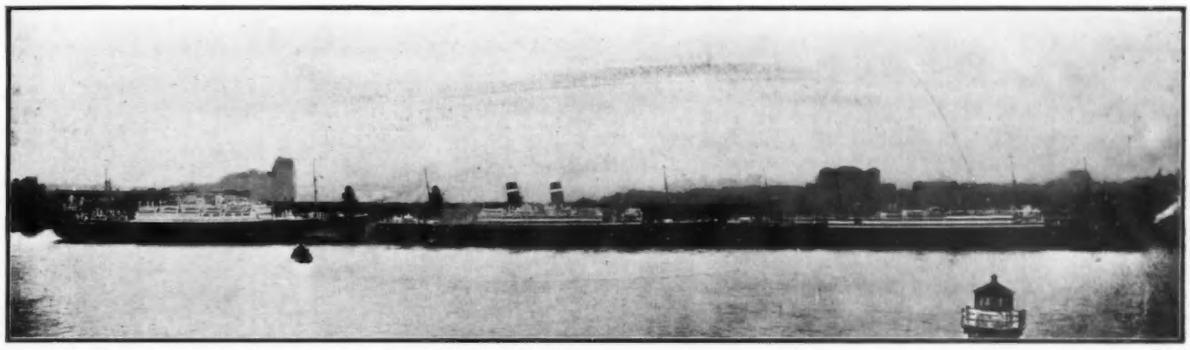
According to the monthly approximate traffic return of the Manchester Ship Canal Co., receipts in March amounted to £91,926, being an increase as compared with March, 1932, of £9,160. It is worth also noting that the receipts for the month were actually larger than those in March, 1931. Receipts for the first three months of this year were £7,446 less than those in the corresponding period of 1932, and £14,078 less than in that of 1931; they were £57,932 less than in the first three months of 1930.

Another Freight Service on the St. Lawrence Route.

The Ellerman's Wilson Line of Hull, England, is about to inaugurate a regular freight steamship service from Montreal to Hull, Middlesbrough and Aberdeen. The Company entered the Canadian Atlantic service during the past winter with a service from Halifax to Hull, Newcastle-on-Tyne and Aberdeen. The large freight steamer "Lepanto" of 6,368 tons gross and 4,020 tons net register will inaugurate the new service on May 10th, and the vessel will be followed on May 31st by the "Francisco," of 6,272 tons gross and 4,746 tons net register. These two steamers and others to be operated in the new service are equipped with refrigerators for carriage of cargo at temperatures between 25 and 30 degrees, and also cool air chambers provided with fan ventilation.

The Port of Halifax: Canada's Atlantic Gateway

By ALAN S. MARTIN, Secretary, Halifax Harbour Commissioners



57,000 tons of Shipping at the Quay Wall, Halifax.

ALTHOUGH it will probably be a long time before all the fruits of the trade agreements negotiated at the Ottawa Conference are gathered, it is generally accepted that there will, in the near future, be very considerably increased trade between the different parts of the Empire. Prospective steamship sailings are usually a reliable barometer of the expectations of the shipowner, and judging by the new steamship schedules and changed routes already announced, shipowners are anticipating definite and fairly quick changes in certain trade channels and are making every preparation possible to take advantage of the changed conditions.

Canada occupies a position of great importance in Empire trade to-day, and announcements already made indicate that her ports will be required to take care of a greatly increased volume of traffic during the next few years. It is reasonable, therefore, to anticipate and answer the question—"Can they handle it?"

Ons of the purposes of this article is to answer this question so far as the Port of Halifax is concerned.

Halifax is Canada's Atlantic port, never closed by winter and able to dock the largest vessel afloat. It occupies a position of considerable importance on the North Atlantic seaboard. It is nearer to Europe than any other competitive North American port and practically on the direct line between Northern Europe and New York. Owing to its geographical position, it is ideally situated as a transhipment port and for the distribution of goods throughout the Maritime Provinces of Canada.

Owing also to its position, it is used as a port of call by many steamship lines which have frequent sailings to and from all parts of the world. Combined with this advantage, a fast freight service makes the port the choice of many shippers in the interior who wish to save time on their shipments.

While it is true that, owing to the freezing of the St. Lawrence, Halifax's busy season is in the winter, its summer trade is being greatly increased and diversified and it is taking a more important place in the transportation and economic life of the Dominion.

As regards its approaches and general characteristics, it may be mentioned that the harbour is reached from the open sea by a perfectly straight channel of great depth. It is about 9 square miles in area, its current is negligible and the rise of tide is only 6-ft. All these factors contribute to the extreme ease of navigation and the small amount of time which has to be expended by vessels calling at the Port.

At the present time, the Halifax Harbour Commissioners operate 16 berths with ample depth of water and transit shed accommodation, not including Pier "B" which is just coming into operation.

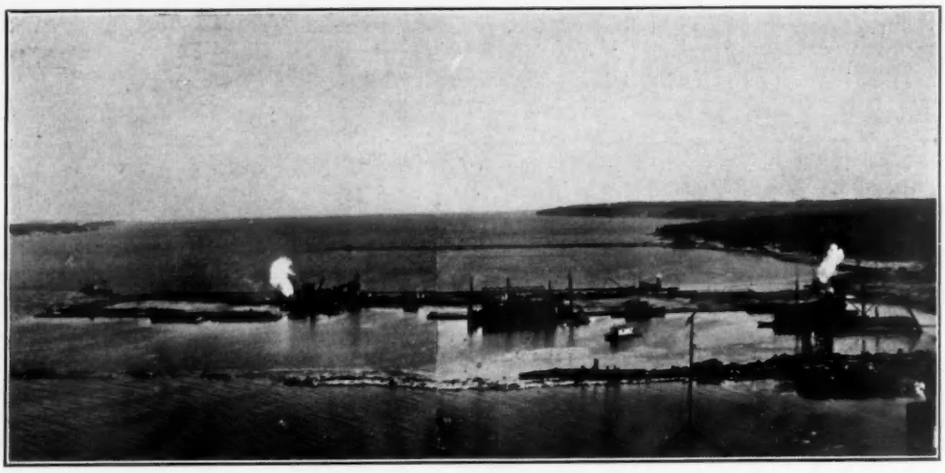
The Terminal Developments are situated in three areas—Richmond at the north end of the city; Deepwater Terminals in the centre; and Ocean Terminals in the south.

At Richmond is Pier 9, 700-ft. long, mainly used for cattle loading and open storage and by industrial undertakings.

At Deepwater Terminals are three piers—Nos. 2, 3 and 4. These three piers provide 6 berths, 2 over 500-ft. in length and the other four over 600-ft. in length. There is ample rail trackage and transit shed accommodation and, in addition, the second storey of the transit shed at Pier 2, which is a concrete shed 680-ft. by 200-ft., has been converted into an insulated

Upper Floor of Transit Shed on Pier 2 at Completion of Contract for Insulation and Frost-proofing.

The Port of Halifax—continued



Pier "B," Halifax, in Course of Construction.

heated warehouse. It provides splendid accommodation for all classes of goods but is especially valuable for perishables. Many hundreds of thousands of Prince Edward Island potatoes passed through this warehouse during the winter of 1930-31.

At Ocean Terminals the most recent developments at the port of Halifax have been, and are still, taking place. Here are nine berths of the most modern construction, eight of them with transit sheds over 500-ft. long and all with extensive pier track and siding accommodation.

The three berths 20, 21 and 22, each one over 600-ft. in length in a continuous straight line, together form one of the finest landing quays in the world, of concrete construction, 2,007-ft. long, with 45-ft. of water at low tide and continuous steel frame transit sheds throughout the entire length. There are also five lines of railway tracks along the whole length of these sheds. Above Shed 21 are situated the Immigration Quarters connected with the Railway Station and the whole form a terminal unit designed to give the very best and quickest despatch for both passengers and freight.

In other ways the Ocean Terminals are laid out with every consideration for the quick despatch of ships. The piers have exceptionally good approaches, both from sea and land, and the sheds are all designed specially for the work which they have to perform. Shed 27, for instance, is 655-ft. by 90-ft., with a mastic floor without a single pillar or post to obstruct the rapid movement of cargo across it. Along its entire length runs a covered 3-track train shed 42-ft. wide, into which can be switched pre-heated cars to take bananas or other tropical fruits in the winter, and at one end of this shed there are four temperature-regulated storage chambers for fruits and vegetables which are not immediately moved out. It is used almost entirely by ships trading with the West Indies.

The latest development of all, viz., Pier "B," has just been completed, although sheds have not yet been built. This pier is 1,250-ft. long by 300-ft. wide, of concrete crib construction. It will provide one berth 970-ft. long and one berth 760-ft., both with 45-ft. of water at low tide, and one berth 490-ft. and one berth 280-ft., both with 35-ft. of water at low tide.

It may be mentioned that all piers are equipped with complete fire protection appliances and all are patrolled by Harbour Police. There are heated and locked storage chambers throughout the transit sheds. All piers have rail connections and ample siding accommodation.

The unloading and loading of ships is carried out with ships' gear, as is customary at many North American ports.

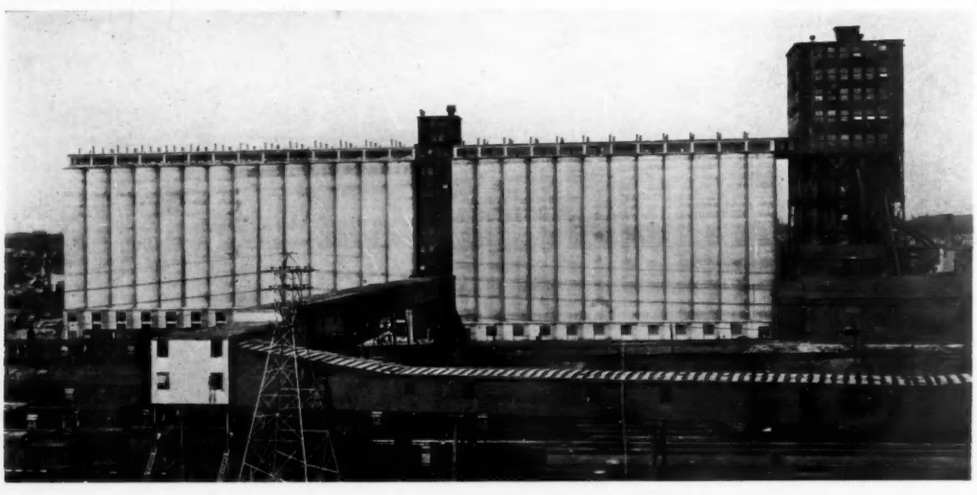
The grain elevator, with a capacity of 2,200,000 bushels, and an up-to-date cold storage plant with a capacity of 2,000,000 cubic feet, are also situated at the Ocean Terminals. The elevator is equipped with a workhouse containing two receiving legs and four shipping legs, with an additional shipping house containing two shipping legs and one transfer leg. The unloading house has one mechanically operated car dumper and three shovel unloading pits.

Grain cargoes can be loaded at five different berths which are connected by shipping belts to the elevator. The capacity of each belt is about 14,000 or 15,000 bushels per hour. Within the last year, a marine tower for unloading water-borne shipments has been installed at Berth 25 and is connected with the elevator. The capacity of this tower is 15,000 bushels per hour.

It will be seen, therefore, that Halifax is well equipped to handle inbound shipments of grain by rail or water and to load grain cargoes expeditiously and cheaply. It may be mentioned that the whole elevator system has lately been thoroughly overhauled so as to give maximum efficiency and performance and to insure that it will be able to meet any calls made upon it.

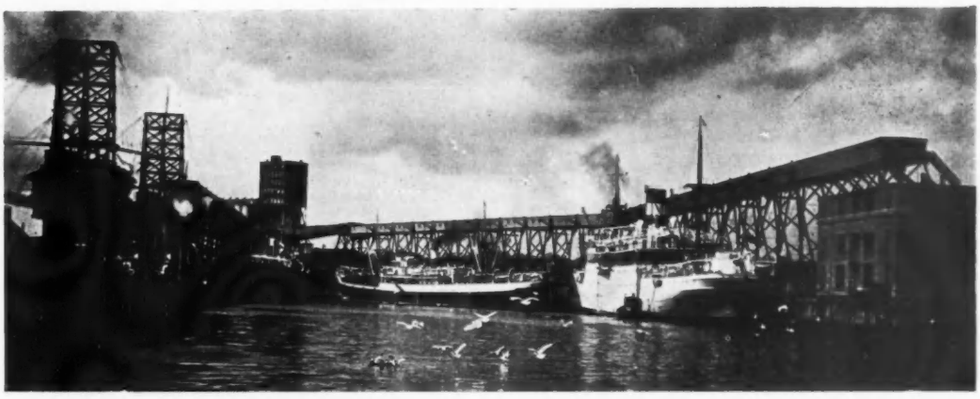
All subsidiary services needed by ships are available at the port—coal and oil bunkering, tug service, dockside water connections, a floating crane with a maximum lifting capacity of 75 tons, ship repair plant and a graving dock. It may be mentioned that the graving dock is 569-ft. long with a draft of water over the sill of 30-ft., and there are also shipbuilding facilities and a salvage steamer.

The Naval Dockyard is situated between Deepwater and Richmond Terminals and there is a well equipped airport three miles from the Ocean Terminals. In view of the rapidity of aerial development, this latter fact has considerable potential value. Already tentative air plans which would involve the use of Halifax have been put forward by different aerial



Grain Elevator, Halifax.

The Port of Halifax—continued



Ships in Berth at Halifax.

organizations and when transcontinental airways are developed in connection with the Atlantic mail service, Halifax appears to be marked as the ideal connecting link between sea and air.

Entrance to Halifax Harbour.

Time was when Halifax was regarded solely as a winter port, but efforts have been made during the last few years, with a considerable amount of success, to develop traffic through the port during the summer months. The developments for the most part have been made in two directions. First, increased trade by water between Halifax and the Great Lakes and St. Lawrence River ports, coupled with a greater use of the port as a transhipment point and for the distribution of goods throughout the Maritime Provinces; second, the extensive use of the port during the summer months by some of the largest trans-Atlantic liners on short tours from New York. This last development has taken place almost entirely during the last two years, during which time the s.s. "Majestic," s.s. "Berengaria," s.s. "Leviathan," and many other famous ships have visited the port. The immediate cause of this movement appears to have been a combination of several circumstances which, in conjunction, made the business possible and profitable for the steamship companies. When the trans-Atlantic business picks up again, it is possible that the largest ships may be withdrawn from this service, but the business of the last two years has been sufficiently profitable to the steamship companies that it seems unlikely that they will be willing to forego such a useful source of additional revenue, in which case they may keep these tours as a permanent feature for some of their smaller liners. The movement has not much significance from the point of view of trade, but it has made the port and province familiar to a considerable number of visitors from the United States, and it has also been of value to the port by substantiating and advertising the claims made in regard to its ability to handle the world's largest ships and in regard to the ease of navigation within its limits.

Towards the close of 1932, various steamship companies announced increased sailings to or from the Port of Halifax, giving the port direct steamship communication with a considerably increased number of other world ports.

Speaking generally, therefore, it may be said that in recent years Halifax has made considerable strides as an integral part of the Canadian and International transportation system. Halifax has a long record of which it is not ashamed and to which, on the proper occasions, it looks back with pride. It is now, however, living very much in the present and is fully alive to the necessity of being ready for whatever trade developments and changes the future may bring.

Bremen's Seagoing Shipping Traffic

In February there was a decline in shipping arrivals compared with the previous month, which were 530,155 net registered tons, by 64,936 net registered tons, and compared with February, 1932, of 30,462 net registered tons, or 5 per cent.

Since the beginning of the year 952 vessels with 1,125,273 net registered tons arrived, against 824 vessels with 1,226,847 net registered tons in the first two months of 1932. The number of vessels was thus 128, or 16 per cent. greater, but the tonnage 101,572 net registered tons, or 8 per cent. smaller, showing growing traffic of small coastal vessels, compared with a decrease in large shipping.

In seaborne goods traffic of the five most important Weser ports, total goods traffic in February, with 412,300 tons, exceeded that of the previous month slightly. However, only exports have increased. These, with 192,800 tons, rose by 7,800 tons, chiefly due to greater shipments of iron. Imports amounted to 219,500 tons, or 7,770 tons less. Particularly imports of cotton, grain, rice and phosphate were smaller, arrivals of timber, oilseeds, mineral oil, and piece goods higher. Compared with February, 1932, imports were 10,300 tons, or 4 per cent. less, as at that time considerably larger imports of grain were made. In exports, on the other hand, there was an increase of 61,200 tons, or 46 per cent. Besides larger shipments of coal—particularly via Nordenham—iron, potash and salt exports were larger. For both directions together there was an increase in traffic of 50,900 tons, or 14 per cent.

In the first two months of this year 824,500 tons were imported and exported, compared with 753,700 tons in the same period of the previous year. Thus goods traffic was 70,800 tons, or 9 per cent. larger. Imports, however, were less. They amounted to 446,700 tons, and were thus 46,100 tons—10 per cent. less than in the previous year. The loss is borne in the first place by grain, arrivals of which fell from 124,000 tons to 63,000 tons, i.e., almost by half. Exports showed with 377,800 tons, 116,900 tons, or 42 per cent. more, due to larger shipments of coal.

Bristol and the New Zealand Trade.

An outstanding feature of the trade of the port of Bristol during the last year or two has been the development in the importation of dairy produce and frozen meat from New Zealand. Double the quantity of butter received during the whole of 1930 has been dealt with in the first three months of this year, and the imports of butter are already within reach of last year's record figure of 211,000 boxes. Shipments of meat and cheese have also maintained a steady and consistent increase. The first consignment this season of apples from New Zealand is on passage to Avonmouth on the s.s. "Tekoa," consisting of approximately 7,000 cases.

North-East Coast Notes.

Blyth's Fine Record.

BLYTH HARBOUR still has the honour of leading the coal trade on the North-East Coast, at least in a comparative sense, for while the Tyne and the Wear are regretting decreased shipments from the respective rivers this year, Blyth continues to show an increase. The figures for the latter port are somewhat striking, for there has for a considerable number of years been a regular improvement in the coal trade there, so that to continue the upward movement becomes increasingly difficult. Nevertheless, at the March meeting of the Blyth Harbour Commission, Mr. Ridley Warham, the chairman, said he felt that that body was fortunate in being able to maintain such a satisfactory position in regard to the coal export trade. The coal shipments for February were as follows, with comparative figures for 1932 and 1913, as well as the totals for the two months of the same years:—February shipments: 1933, 443,599 tons; 1932, 419,391 tons; 1913, 393,093 tons. The shipments for the two months of the same periods were: 1933, 909,022 tons; 1932, 862,247 tons; 1913, 764,474 tons. These latter totals show an increase of 5 per cent. on 1932, and 19 per cent. on 1913.

At the same meeting the Engineer reported that during the recent south-easterly gale there had been an opportunity of testing the value of the wave expanding basin inside the west pier, which had proved its value in diminishing the distance that the range travelled up the channel, although it was not possible to eliminate it entirely under such severe weather conditions.

Tyne Commission and Development Conference.

The Tyne Commission, at its meeting in March, decided to ask their Finance Committee to consider further the question of giving financial support to the Tyneside Development Conference. There was considerable opposition to this proposal, but the motion was carried by 14 votes to 8. However, at the April meeting of the Tyne Commission the Finance Committee reported that they saw no reason for departing from their previous decision recommending that no further grant be made to the Tyneside Industrial Development Conference. Mr. Francis Priestman, the chairman of that Committee, in moving the adoption of the Committee's recommendation, said the Committee had had the remit before them on two occasions since the meeting of the Commission, and the last decision of the Committee spoke for itself.

Tyne Trade Figures.

The coal and coke shipments from the Tyne during February totalled 1,023,841 tons, a decrease of 69,773 tons compared with the same month last year. In the first two months of this year the shipments totalled 2,163,221 tons, a decrease of 97,146 tons on the same period of last year.

The Docks and Trade Committee recommended that the charge for the use of the anti-coal breakage appliance at No. 5 staith at Whitehill Point, namely 2d. per ton for coal and 4d. per ton for coke, be reduced by 50 per cent., and that the question be reconsidered a year hence.

Another important matter before the meeting was the appointment of a Superintendent of River Police and Chief Constable. From 74 applicants the Board appointed Detective-Sergeant Douglas Atkinson, of Chesterfield.

Smart Work at Staiths.

Two notable instances of smart loading on the Tyne have been recently reported. The first was accomplished at Dunston Staiths in March, when the steamer "Heworth," of Newcastle, between 10.30 at night and 9 o'clock next morning took on board 4,450 tons of cargo coal and bunkers. The "Heworth" has made a series of quick voyages to the Continent recently, and carried three cargoes of coal from the Tyne to Ymuiden and Rotterdam in twelve days. The other piece of good work was a smart performance at Harton Staiths at South Shields, where in 32 hours the steamer "Redsea" loaded 9,025 tons of cargo and bunkers

Personal.

Mr. R. I. James has been appointed chairman of the North of England Shipowners' Association. He is a well-known figure on Newcastle Quayside, being connected with several local industrial concerns, and being managing director of Messrs. R. S. Dalgliesh and Co., shipowners, of Newcastle.

New Magazine for the Wear.

At the April meeting of the River Wear Commission, the Works Committee reported that they had established a magazine for the storage of explosives in the parapet wall of the new South Pier. The meeting adopted rules for its use which had been approved by the Secretary of State.

The coal shipments for the two months of this year totalled 715,227 tons, against 875,787 tons in 1932, a decrease of 160,560 tons. The general goods imported showed a decrease of 3,533 tons, and the exports, other than coal, 1,612 tons.

Welcome Trade Improvement.

The report submitted to the Tees Conservancy Commission at the beginning of April indicated that there had been a marked improvement in the statistical position of the iron and steel trade. The imports of iron and steel from foreign sources to the Tees in March showed an increase over the figures for February, being 2,256 tons as compared with 928 tons in February, but during the last five months these imports have shown a marked contraction amounting to 5,141 tons only against 69,843 tons in the corresponding period of a year ago. The clearances of pig iron from the Tees in March were the heaviest for any month since April, 1932. This is largely due to the fact that the deliveries to Scotland, which were no more than 1,475 tons in February, amounted to 10,036 tons in March, whilst the shipments to foreign ports also advanced from 2,339 tons to 4,324 tons, Japan having been a considerable buyer of local iron. It is worthy of note that during the month three blast furnaces have been put into operation, increasing the number at work on the North-East Coast from 15 to 18. In addition, Skinningrove Steel Works have restarted, and there is a prospect of increased output at other local works.

The Port of Amsterdam

The position of the Port of Amsterdam can be seen from the following figures in regard to the number of vessels and tonnage and to the goods traffic arrived and sailed, as compared with the corresponding figures of last year:

SEAGOING VESSELS AND TONNAGE.

		ARRIVALS				SAILINGS			
		No.	Per Cent.	N.R.T.	Per Cent.	No.	Per Cent.	N.R.T.	Per Cent.
March	1932	287		405,594		275		404,522	
,,	1933	275		411,809		279		433,463	
		−12	−4·18	+6,215	+1·53	+4	+1.45	+28,941	+7·15
February	1933	255		385,924		239		347,990	
March	1933	275		411,809		279		433,463	
		+20	+7·84	+25,885	+6·71	40	+16·74	+85,473	+24·56
Jan.-Mar.	1932	820		1,223,350		824		1,260,368	
,,	1933	788		1,160,913		789		1,191,967	
		−32	−3·90	−62,437	−5·10	−35	−4·25	−68,401	−5·43

SEAGOINC GOODS TRAFFIC
(In Tons of 1000 Kilos*).

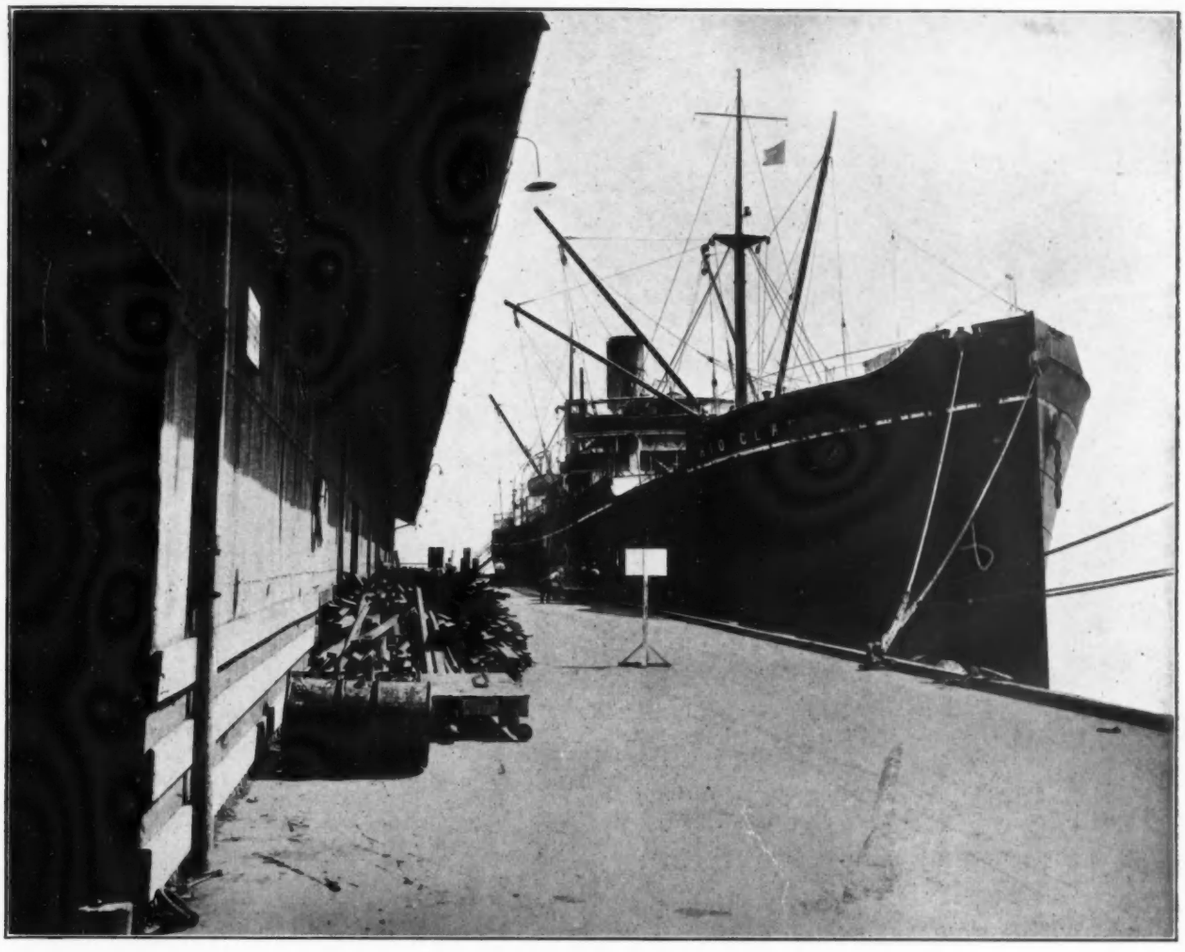
			1 Import	2 Transit incl. in col. 1	3 Export	4 Transit incl. in col. 3	5 Total col. 1 & 3
February	1932	...	284,387	49,251	168,120	33,013	452,507
,,	1933	...	238,737	41,295	110,819	33,925	349,556
			−45,650	−7,956	−57,301	+912	−102,951
			−16·05%	−16·15%	−34·08%	+ 2·76%	−22·75%
January	1933	...	332,857	60,202	121,329	49,311	454,186
February	1933	...	238,737	41,295	110,819	33,925	349,556
			−94,120	−18,907	−10,510	+15,386	−104,630
			−28·28%	−31·41%	−8.66%	− 31·20%	−23·04%
Jan./Feb.	1932	...	656,040	106,108	292,179	69,314	948,219
,,	1933	...	571,594	101,497	232,148	83,236	803,742
			−84,446	−4,611	−60,031	+13,922	−144,477
			−12·87%	−4·35%	−20·55%	+ 20·09%	−15·24%

*These figures have been taken from the monthly statistics of the Central Bureau, The Hague, Holland.

Classified according to flag, the number of vessels which entered the Port of Amsterdam during March was:—Dutch, 139; Great Britain, 53; German, 41; Swedish, 12; Norwegian, 10; American, 1; French, 2; Greek, 3; Spanish, 2; Polish, 2; Italian, 4; Estonian, 1; Belgium, 2; Russian, 1; Panamanian, 1; Lithuanian, 1.

Vessels laid up at Amsterdam:—1st March, 1933: 37 vessels, measuring 208,791 tons gross. 1st April 1932: 50 vessels, measuring 261,353 tons gross; 1st April, 1933, 34 vessels, measuring 187,626 tons gross.

The Port of Cairns, North Queensland, Australia



Concrete Wharves, 1,900 lineal feet in length.

THE Port of Cairns, which is situated in North Queensland, Australia, is the first large port of commercial importance on the east coast of Australia for vessels proceeding to Australia from the north. The Harbour itself is situated on the west side of Trinity Inlet on the inner edge of Trinity Bay, this bay being bounded on the north-west by Barron River and on the east by False Cape, the distance across being 3¾ miles. (See Supplement).

Passages through Barrier Reef.

It is favoured by two good navigable passages through the Barrier Reef opposite Cairns, i.e., Grafton Passage and Trinity Opening. The outer end of Grafton Passage is situated approximately in lat. 16° 40 min. S. and only 25 miles distant from Fitzroy Island, on which is placed a light with a radius of 15 miles. The Cairns Harbour Board is at present negotiating with the Department of Commerce, Canberra, with a view to having installed a 10-mile light on Euston Reef (Barrier Reef) at the outer entrance to Grafton Passage, thus effectively lighting the whole of this comparatively short, straight Passage. Ships greatly favour this Passage at present on account of the straightness of same. The landfalls of the north-western of the Two Bell Peaks in line with the south shoulder of Fitzroy Island, bearing S. 30° W. leads through almost mid-channel—which is of about 5 miles width—between Arlington Reef on the west and the Thelford Reef on the east; Fitzroy summit in line with N.W. Bell Peaks, bearing S. 27° W. clears Arlington Reef to the eastward.

Trinity Opening leads from the sea into Trinity Bay. It extends from Oyster Cay on the south to Batt Reef on the north, a distance of 10 miles in width. Pixie Reef (sand patch) lies midway between Batt and Oyster Reefs on their inner edges. Numerous detached reefs and coral patches lie scattered about in mid-channel, and as it has not been closely examined, many other dangers probably exist which have never been discovered; hence Grafton Passage is more extensively used.

Entrance to Port, Depth of Water, etc.

The Port is admirably sheltered and secure, as the high ranges by which it is surrounded (except to the north) offer ample protection from the winds, while the mud bank across the entrance to the Inlet proves an effective barrier which prevents any swell being felt in the Harbour. The bar cutting entrance to Cairns commences at a point known as the Fairway Buoy, and is distant 5½ miles from the city. It is marked on the east side by 10 black beacons and on the west side with 8 red triangular beacons. The channel is a straight run, with a maximum width of 180-ft. at the present time, and carries 22-ft. L.W.O.S.T. Nature of material through which channel runs is soft mud. After passing through channel, the inlet widens to 1,300-ft., and carries up to 30-ft. at low water in centre and 26½-ft. along the quay line, excepting at No. 6 wharf, which has 30-ft. giving ample room for manœuvring large vessels. The inlet runs about 5 miles past the city, carrying from 18 to 30-ft. of water, mean spring rise of tide is from 6 to 9-ft., neaps 4 to 6-ft. The diurnal inequality varies but is from 6-in. to 2-ft. 6-in. at springs. Ships of over 14,000 tons gross register have negotiated this channel, also ships drawing over 27-ft. of water.

Control of Port.

The Port of Cairns is controlled by the Cairns Harbour Board which was constituted by Act of Parliament 20th December, 1905, and came into force 1st January, 1906. The Board consists of 12 members representing the City of Cairns and adjoining Shires of Cairns, Woothakata, Tinaroo, Eacham, Herberton, Etheridge.

Up-to-date and Economical Port.

The modern wharf facilities and large storage accommodation at the wharves at Cairns have made it a most economical port for the handling of large bulk cargoes, such as sugar, the loading capacity per day being 2,400 tons. Overseas ships visit the Port frequently during months June to January. Some 170,000 tons of sugar approximately is loaded at the Port during the season, of which more than 100,000 tons is loaded direct by overseas ships at the wharves.

The largest vessel that has visited the Port of Cairns is the s.s. "Northumberland." This vessel had a length of 550-ft. beam 65-ft., depth 32-ft., with a gross register tonnage of 12,160 tons.

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The coal and coke shipments from the Tyne during February totalled 1,023,841 tons, a decrease of 69,773 tons compared with the same month last year. In the first two months of this year the shipments totalled 2,163,221 tons, a decrease of 97,146 tons on the same period of last year.

The Docks and Trade Committee recommended that the charge for the use of the anti-coal breakage appliance at No. 5 staith at Whitehill Point, namely 2d. per ton for coal and 4d. per ton for coke, be reduced by 50 per cent., and that the question be reconsidered a year hence.

Another important matter before the meeting was the appointment of a Superintendent of River Police and Chief Constable. From 74 applicants the Board appointed Detective-Sergeant Douglas Atkinson, of Chesterfield.

Smart Work at Staiths.

Two notable instances of smart loading on the Tyne have been recently reported. The first was accomplished at Dunston Staiths in March, when the steamer "Heworth," of Newcastle, between 10.30 at night and 9 o'clock next morning took on board 4,450 tons of cargo coal and bunkers. The "Heworth" has made a series of quick voyages to the Continent recently, and carried three cargoes of coal from the Tyne to Ymuiden and Rotterdam in twelve days. The other piece of good work was a smart performance at Harton Staiths at South Shields, where in 32 hours the steamer "Redsea" loaded 9,025 tons of cargo and bunkers

Personal.

Mr. R. I. James has been appointed chairman of the North of England Shipowners' Association. He is a well-known figure on Newcastle Quayside, being connected with several local industrial concerns, and being managing director of Messrs. R. S. Dalgliesh and Co., shipowners, of Newcastle.

New Magazine for the Wear.

At the April meeting of the River Wear Commission, the Works Committee reported that they had established a magazine for the storage of explosives in the parapet wall of the new South Pier. The meeting adopted rules for its use which had been approved by the Secretary of State.

The coal shipments for the two months of this year totalled 715,227 tons, against 875,787 tons in 1932, a decrease of 160,560 tons. The general goods imported showed a decrease of 3,533 tons, and the exports, other than coal, 1,612 tons.

Welcome Trade Improvement.

The report submitted to the Tees Conservancy Commission at the beginning of April indicated that there had been a marked improvement in the statistical position of the iron and steel trade. The imports of iron and steel from foreign sources to the Tees in March showed an increase over the figures for February, being 2,256 tons as compared with 928 tons in February, but during the last five months these imports have shown a marked contraction amounting to 5,141 tons only against 69,843 tons in the corresponding period of a year ago. The clearances of pig iron from the Tees in March were the heaviest for any month since April, 1932. This is largely due to the fact that the deliveries to Scotland, which were no more than 1,475 tons in February, amounted to 10,036 tons in March, whilst the shipments to foreign ports also advanced from 2,339 tons to 4,324 tons, Japan having been a considerable buyer of local iron. It is worthy of note that during the month three blast furnaces have been put into operation, increasing the number at work on the North-East Coast from 15 to 18. In addition, Skinningrove Steel Works have restarted, and there is a prospect of increased output at other local works.

The Port of Amsterdam

The position of the Port of Amsterdam can be seen from the following figures in regard to the number of vessels and tonnage and to the goods traffic arrived and sailed, as compared with the corresponding figures of last year:

SEAGOING VESSELS AND TONNAGE.

		ARRIVALS				SAILINGS			
		No.	Per Cent.	N.R.T.	Per Cent.	No.	Per Cent.	N.R.T.	Per Cent.
March	1932	287		405,594		275		404,522	
,,	1933	275		411,809		279		433,463	
		−12	−4·18	+6,215	+1·53	+4	+1.45	+28,941	+7·15
February	1933	255		385,924		239		347,990	
March	1933	275		411,809		279		433,463	
		+20	+7·84	+25,885	+6·71	40	+16·74	+85,473	+24·56
Jan.-Mar.	1932	820		1,223,350		824		1,260,368	
,,	1933	788		1,160,913		789		1,191,967	
		−32	−3·90	−62,437	−5·10	−35	−4·25	−68,401	−5·43

SEAGOING GOODS TRAFFIC
(In Tons of 1000 Kilos*).

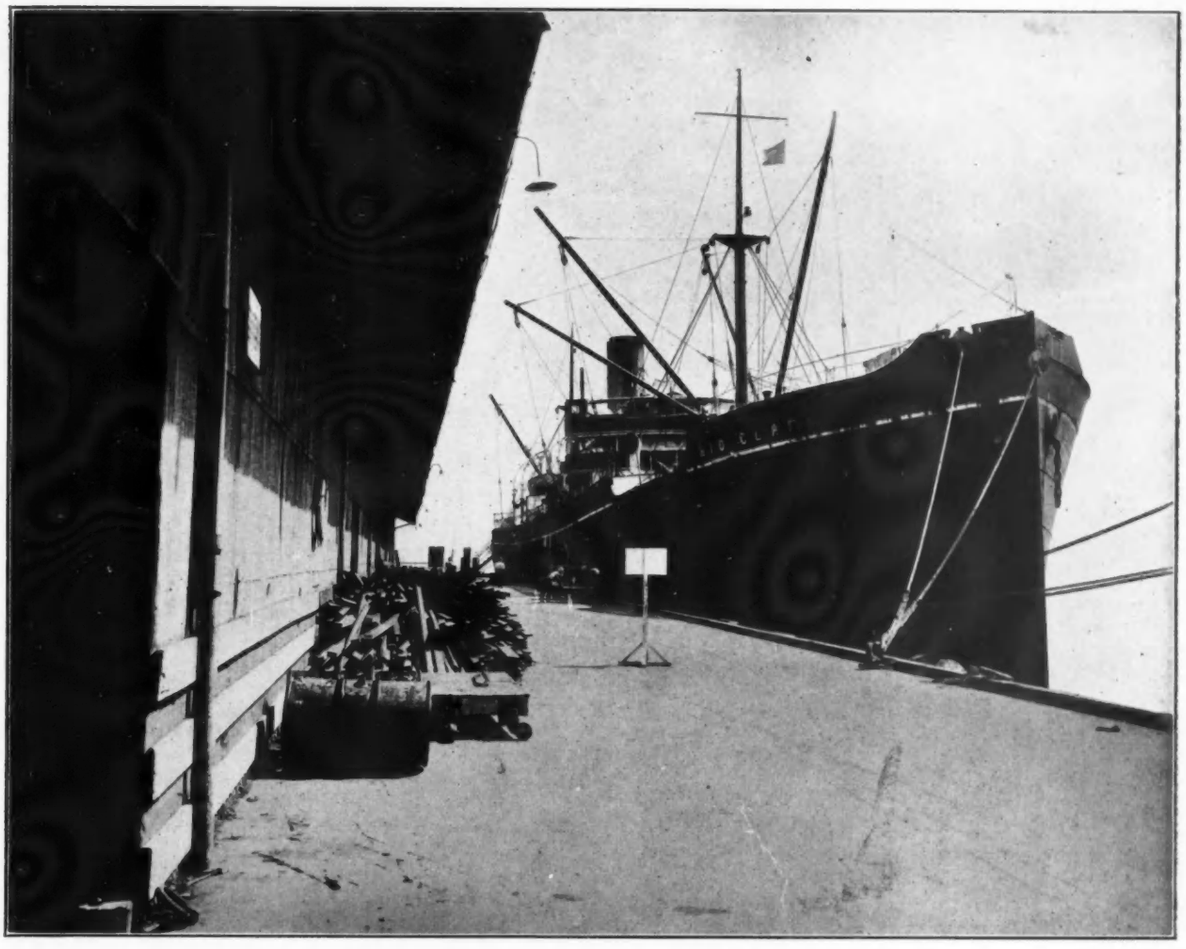
			1 Import	2 Transit incl. in col. 1	3 Export	4 Transit incl. in col. 3	5 Total col. 1 & 3
February	1932	...	284,387	49,251	168,120	33,013	452,507
,,	1933	...	238,737	41,295	110,819	33,925	349,556
			−45,650	−7,956	−57,301	+912	−102,951
			−16·05%	−16·15%	−34·08%	+2·76%	−22·75%
January	1933	...	332,857	60,202	121,329	49,311	454,186
February	1933	...	238,737	41,295	110,819	33,925	349,556
			−94,120	−18,907	−10,510	+15,386	−104,630
			−28·28%	−31·41%	−8.66%	−31·20%	−23·04%
Jan./Feb.	1932	...	656,040	106,108	292,179	69,314	948,219
,,	1933	...	571,594	101,497	232,148	83,236	803,742
			−84,446	−4,611	−60,031	+13,922	−144,477
			−12·87%	−4·35%	−20·55%	+20·09%	−15·24%

*These figures have been taken from the monthly statistics of the Central Bureau, The Hague, Holland.

Classified according to flag, the number of vessels which entered the Port of Amsterdam during March was:—Dutch, 139; Great Britain, 53; German, 41; Swedish, 12; Norwegian, 10; American, 1; French, 2; Greek, 3; Spanish, 2; Polish, 2; Italian, 4; Estonian, 1; Belgium, 2; Russian, 1; Panamanian, 1; Lithuanian, 1.

Vessels laid up at Amsterdam:—1st March, 1933: 37 vessels, measuring 208,791 tons gross. 1st April 1932: 50 vessels, measuring 261,353 tons gross; 1st April, 1933, 34 vessels, measuring 187,626 tons gross.

The Port of Cairns, North Queensland, Australia



Concrete Wharves, 1,900 lineal feet in length.

THE Port of Cairns, which is situated in North Queensland, Australia, is the first large port of commercial importance on the east coast of Australia for vessels proceeding to Australia from the north. The Harbour itself is situated on the west side of Trinity Inlet on the inner edge of Trinity Bay, this bay being bounded on the north-west by Barron River and on the east by False Cape, the distance across being 3¾ miles. (See Supplement).

Passages through Barrier Reef.

It is favoured by two good navigable passages through the Barrier Reef opposite Cairns, i.e., Grafton Passage and Trinity Opening. The outer end of Grafton Passage is situated approximately in lat. 16° 40 min. S. and only 25 miles distant from Fitzroy Island, on which is placed a light with a radius of 15 miles. The Cairns Harbour Board is at present negotiating with the Department of Commerce, Canberra, with a view to having installed a 10-mile light on Euston Reef (Barrier Reef) at the outer entrance to Grafton Passage, thus effectively lighting the whole of this comparatively short, straight Passage. Ships greatly favour this Passage at present on account of the straightness of same. The landfalls of the north-western of the Two Bell Peaks in line with the south shoulder of Fitzroy Island, bearing S. 30° W. leads through almost mid-channel—which is of about 5 miles width—between Arlington Reef on the west and the Thelford Reef on the east; Fitzroy summit in line with N.W. Bell Peaks, bearing S. 27° W. clears Arlington Reef to the eastward.

Trinity Opening leads from the sea into Trinity Bay. It extends from Oyster Cay on the south to Batt Reef on the north, a distance of 10 miles in width. Pixie Reef (sand patch) lies midway between Batt and Oyster Reefs on their inner edges. Numerous detached reefs and coral patches lie scattered about in mid-channel, and as it has not been closely examined, many other dangers probably exist which have never been discovered; hence Grafton Passage is more extensively used.

Entrance to Port, Depth of Water, etc.

The Port is admirably sheltered and secure, as the high ranges by which it is surrounded (except to the north) offer ample protection from the winds, while the mud bank across the entrance to the Inlet proves an effective barrier which prevents any swell being felt in the Harbour. The bar cutting entrance to Cairns commences at a point known as the Fairway Buoy, and is distant 5½ miles from the city. It is marked on the east side by 10 black beacons and on the west side with 8 red triangular beacons. The channel is a straight run, with a maximum width of 180-ft. at the present time, and carries 22-ft. L.W.O.S.T. Nature of material through which channel runs is soft mud. After passing through channel, the inlet widens to 1,300-ft., and carries up to 30-ft. at low water in centre and 26½-ft. along the quay line, excepting at No. 6 wharf, which has 30-ft. giving ample room for manœuvring large vessels. The inlet runs about 5 miles past the city, carrying from 18 to 30-ft. of water, mean spring rise of tide is from 6 to 9-ft., neaps 4 to 6-ft. The diurnal inequality varies but is from 6-in. to 2-ft. 6-in. at springs. Ships of over 14,000 tons gross register have negotiated this channel, also ships drawing over 27-ft. of water.

Control of Port.

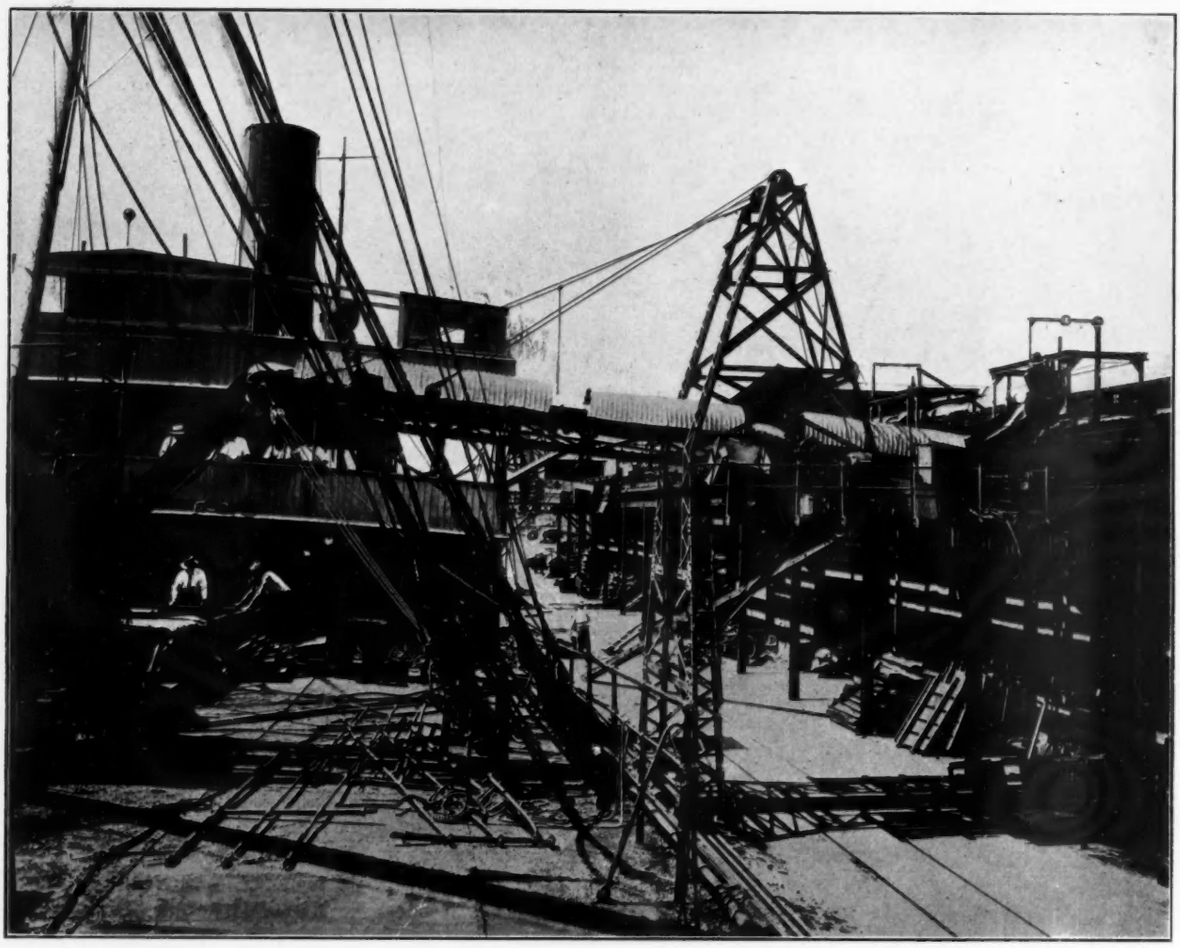
The Port of Cairns is controlled by the Cairns Harbour Board which was constituted by Act of Parliament 20th December, 1905, and came into force 1st January, 1906. The Board consists of 12 members representing the City of Cairns and adjoining Shires of Cairns, Woothakata, Tinaroo, Eacham, Herberton, Etheridge.

Up-to-date and Economical Port.

The modern wharf facilities and large storage accommodation at the wharves at Cairns have made it a most economical port for the handling of large bulk cargoes, such as sugar, the loading capacity per day being 2,400 tons. Overseas ships visit the Port frequently during months June to January. Some 170,000 tons of sugar approximately is loaded at the Port during the season, of which more than 100,000 tons is loaded direct by overseas ships at the wharves.

The largest vessel that has visited the Port of Cairns is the s.s. "Northumberland." This vessel had a length of 550-ft. beam 65-ft., depth 32-ft., with a gross register tonnage of 12,160 tons.

The Port of Cairns, North Queensland, Australia



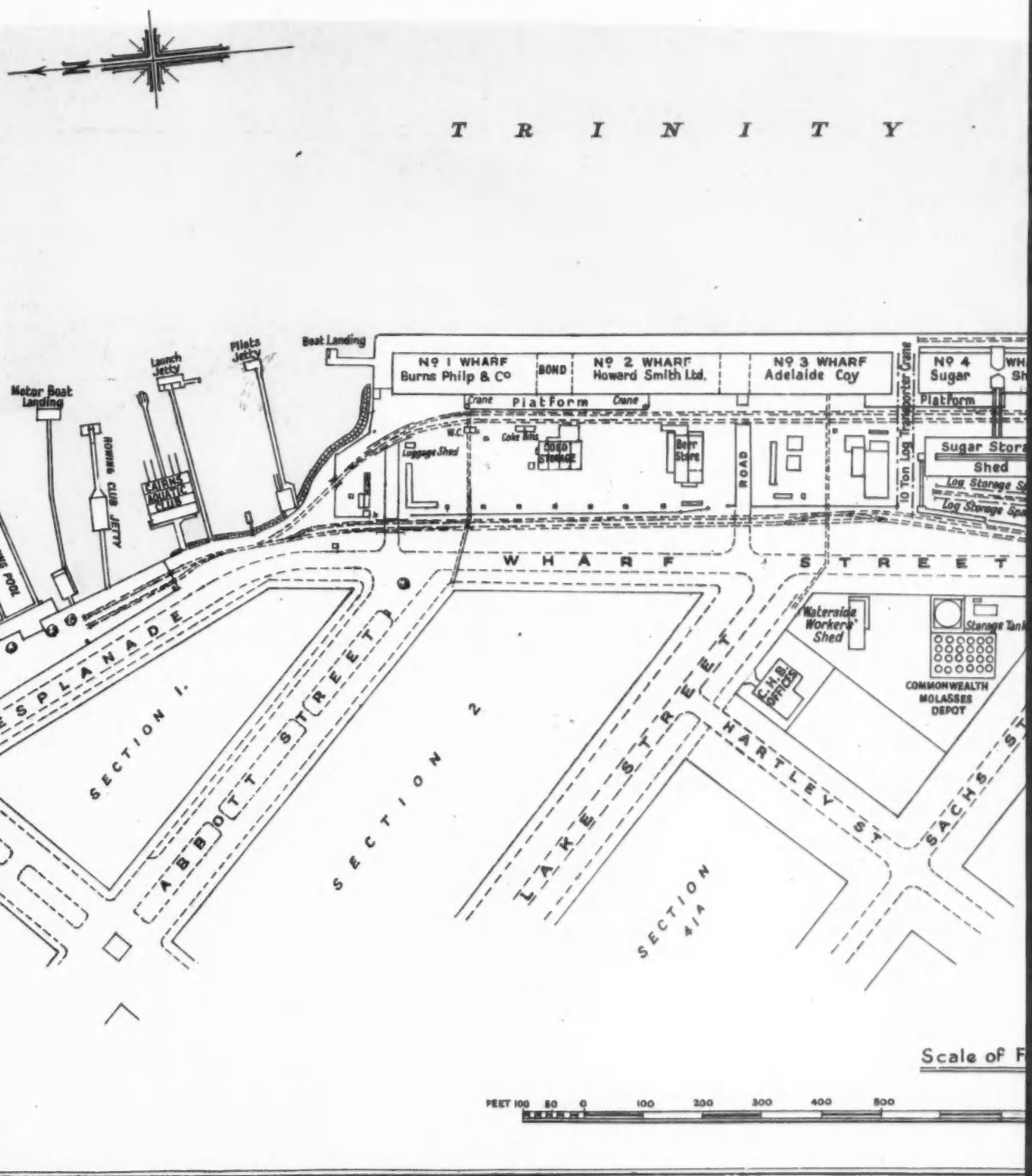
The Wharves, showing Mechanical Equipment for Handling Sugar and Delivering into Ship's Hold.

Interior of Sugar Shed, showing Mechanical Handling Equipment Installed.

CAIRNS HARBOUR.

(QUEENSLAND)

UNDER THE JURISDICTION OF THE CAIRNS HARBOUR BOARD.



WARD & FOXLOW, LITHO. HARGO

PPLEMENT TO THE DOCK AND HARBOUR AUTHORITY,

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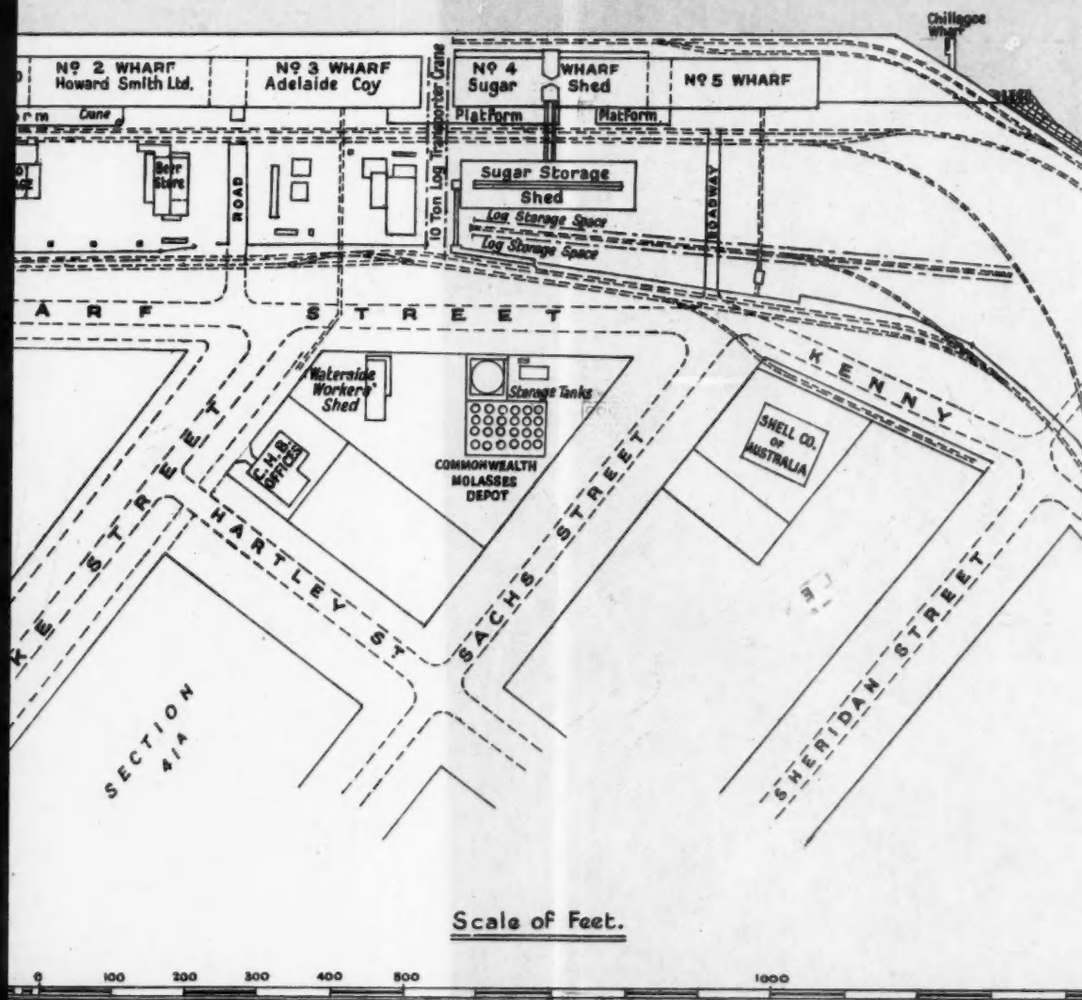
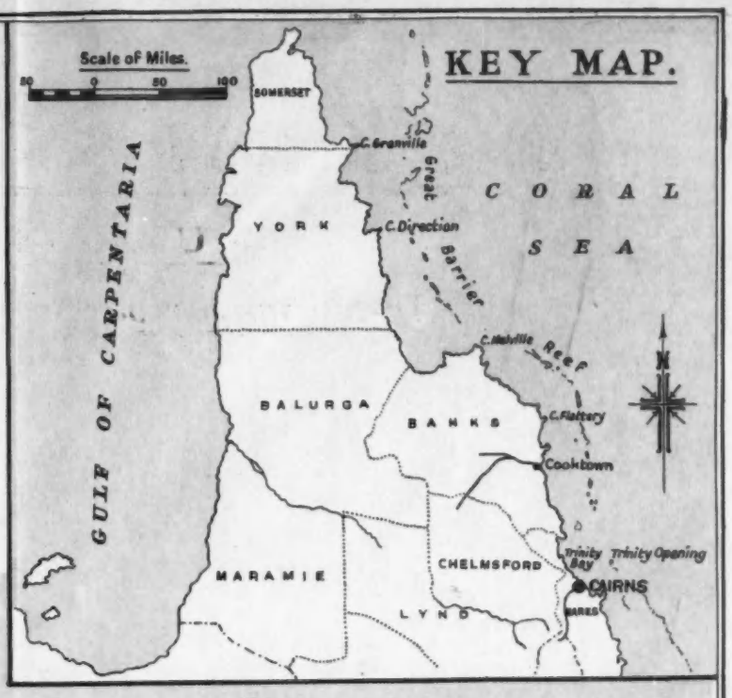
I N I T Y I N L E T

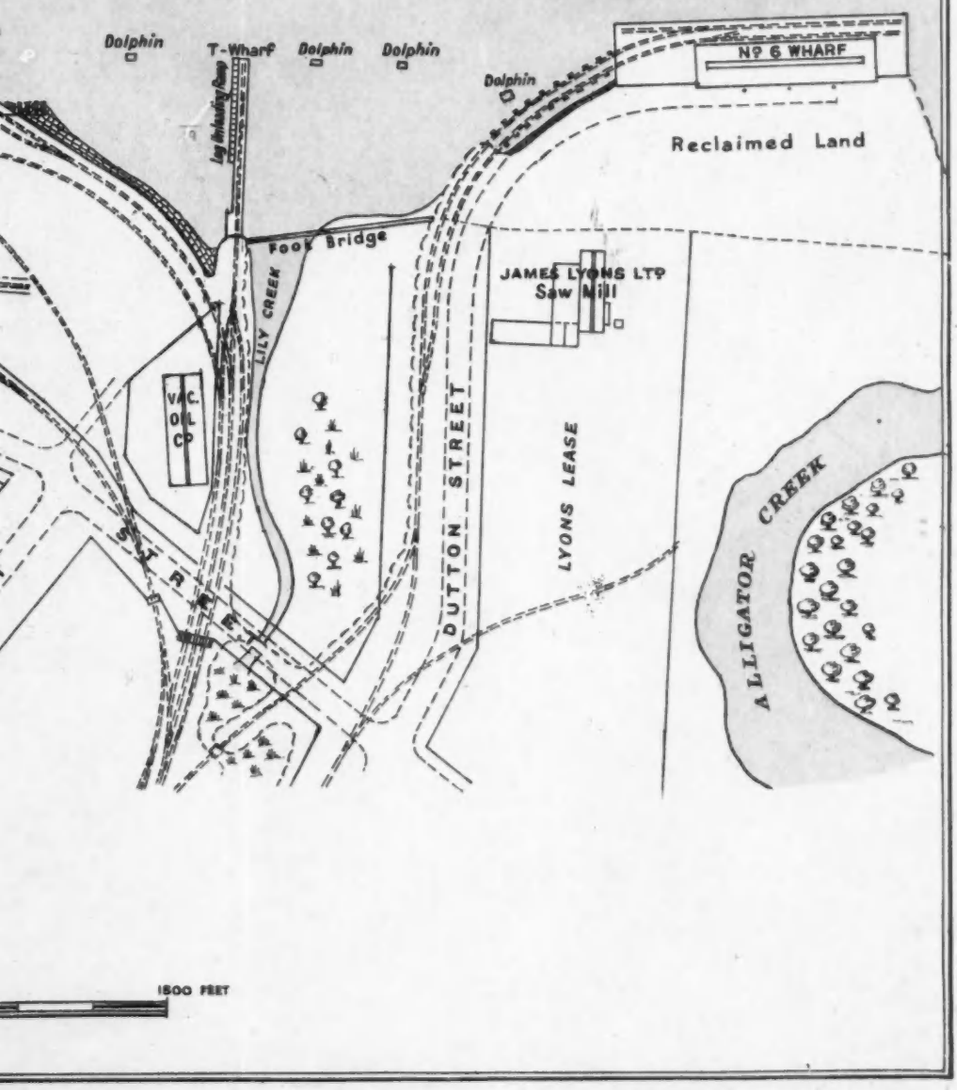


Scale of Feet.

0 100 200 300 400 500 1000

WARD & FOXLOW, LITHO. HARCOURT ST. MARYLEBONE, W.


KEY MAP.
Scale of Miles.
50 0 50 100
SOMERSET
C. Granville
YORK
C. Direction
Barrier Reef
CORAL SEA
GULF OF CARPENTARIA
C. Melville
C. Flattery
BALURGA
BANKS
Cooktown
MARAMIE
CHELMSFORD
Trinity Bay
Trinity Opening
CAIRNS
LYNO

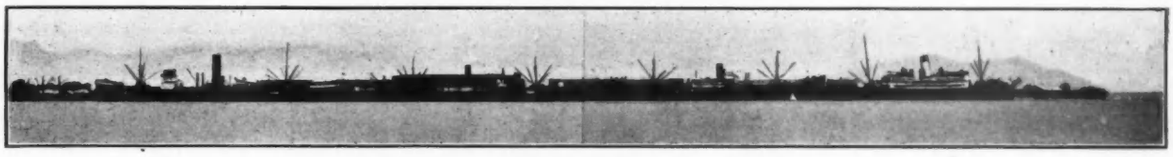

Dolphin
T-Wharf
Dolphin
Dolphin
Dolphin
No 6 WHARF
Reclaimed Land
Foot Bridge
LILY CREEK
JAMES LYONS LTD
Saw Mill
DUTTON STREET
LYONS LEASE
ALLIGATOR CREEK
1500 FEET

CAIRNS HARBOUR

(QUEENSLAND)

UNDER THE JURISDICTION OF THE CAIRNS HARBOUR BOARD

The Port of Cairns—continued



The Port of Cairns: Shipping Berthed at the Wharves.

Wharfage Facilities.

The Board owns and controls the whole of the wharfage facilities which consists of 1,900 lineal feet of concrete wharves (1,500-ft. forming a continuous section), other facilities being "T" end jetty fitted with railway connection and ramps for off-loading logs. Landing attached to No. 1 wharf (Government Jetty for Pilot's use). "T" end Jetty used by launches, 3 sporting clubs each have small jetties for private use.

Wharf Sheds.

There are 6 large, airy, substantial sheds erected on concrete structures with a floor space of 89,020 sq. ft: A large shed for storage of sugar equipped with a comprehensive conveyor scheme stands at rear of No. 4 shed, which has a floor space of 14,000 sq. feet and a storage capacity of 7,000 tons. Stacking rate at 80 tons per hour and 200 tons per hour ex shed into ship with 2 gantry conveyors delivering into ships' holds.

Railway Communication at Wharves.

Railway lines run along the front of Nos. 4, 5 and 6 wharves and along the whole of the back of the wharves from No. 1 to No. 5, continuous sections.

Cranes, etc.

Ten-ton cranes are erected at rear of Nos. 1 and 2 wharves and 10-ton overhead travelling crane behind No. 3 wharf, which extends right out on to the front of the wharf, also an 8-ton electric travelling crane on railway base of 12-ft. which spans the waggons and has a radius of 27-ft. A 2-ton electric capstan is installed at No. 6 wharf for shunting and other purposes.

Cold Stores.

For purpose of storing butter and other perishable commodities whilst awaiting shipment, cold stores and refrigerating plant with storage capacity of 8,388 cu. ft. were erected at rear of No. 1 wharf.

Water.

Fresh water is laid on to the whole of the wharves and jetties from City supply, a 3-in. service extends along front of wharves, the quality of the water is equal to any in the Commonwealth.

Trade.

Principal outward tonnages handled at Port.—Sugar, 173,000 tons (1931 season); timber, 4,487,482 super feet; maize, 8,718 tons; bananas and other fruit, 1,091 tons; butter, 705 tons; molasses, 3,616 tons; minerals, including blister copper, bismuth, molybdenite and wolfram, tin, miscellaneous ores, fluorspar, silver lead bullion, copper ore, 3,071 tons.

Revenue.

Gross cash receipts for year ending 31st December, 1931, were £50,604.

Hinterland.

Cairns is the port for the rich Atherton and Evelyn Tablelands (and their products of butter, bacon, maize and timber) and the fertile tropical coastal lands where great quantities of sugar cane are grown. It is also the Port for some of the finest mineral belts in the world, as the varieties of minerals mentioned herein indicate. Some of the most suitable tobacco lands, it has recently been proved, lie behind the port of Cairns.

Great Tourist Resort.

As a tourist centre it has no equal in Australia for tropical scenery. Its numerous falls, including the well-known Barron, and the Lakes of Eacham and Barrine stand out as unique at least in Australia. The magnificent scenery of the range road which connects Cairns with the Tablelands together with the railway from Cairns to Kuranda for scenic views and as engineering feats surpass anything in Australia. Also at present a road connecting Cairns with Port Douglas is under way, this road will run along in view of the ocean and it is claimed it will be a wonderful scenic highway if not surpassing the beauty of the range road.

Cairns was visited recently by the T.S.S. " Ulysees," 14,651 tons, and her complement of overseas tourists spent three days viewing the great tropical scenery of North Queensland, the scenery of the Barrier Reef as can be seen to advantage off Cairns, where beautiful Green Island and the bird sanctuary of Oyster Cay make the visit of the sightseer most attractive; the wonders of the reef and the marine life attached to same is a most unique study in nature.

Strength in Arc Welding

A comprehensive paper on electric arc welding was read on Friday, 24th March, before the Students' Association of the Institution of Engineers and Shipbuilders in Scotland by Mr. A. Jardine, Junr., of Messrs. Mavor and Coulson, Ltd., Glasgow. The evolution of welding was described; firstly, fusion welding as practised in blacksmiths' shops, then gas welding, and finally electric arc welding. An arc welding plant working from A.C. supply was outlined, and the advantages accruing from the use of heavy coated electrodes were stated. During the welding operation, the electrode coating or flux forms a gaseous envelope round the electrode tip and thereby decreases oxidisation. The molten flux forms a glassy slag which should be chipped off after the welding is finished. Correct and incorrect methods of welding were shown by lantern slides. Electrode movement, the lecturer emphasised, has more influence on the efficiency of a weld than any other mechanical agent; the extent to which the "V" movement of the electrode should be carried depends wholly upon the operator.

There are a great many arrangements of welds in structural work; they can be classified by the direction in which the chief fillets forming the welds are to be loaded or stressed. In the front type of weld, the stress is across the fillet and the weld is in tension or compression. In the lateral type of weld, the stress is lengthwise along the fillet, and the weld is in shear. A graph of butt welds, plotted against tension and shear lap welds, shows that butt welds are by far the stronger.

In calculating the cross-section of a fillet, the section is assumed to be a 45 degree right-angled triangle. The stressed section is defined by a plane bisecting the right angle; in other words, the strength of the fillet is proportional to the distance of the long side of the triangle from the right angle. The cross-section is that distance multiplied by the length of the fillet. The linear strength is approximately proportional to the square root of the linear volume of weld metal deposited; therefore, a light single-run fillet weld has the advantage of economy and strength. This type of weld reduces contractional stresses in the job being welded, and allows the soundness of the joint to be inspected visually. Testing plates for their weldability was discussed, and it was pointed out that mild steel was the easiest metal to weld, but the weldability decreases as the carbon content in the steel increases.

Having outlined the principles involved in a sound weld, the author showed by lantern slides the preparation of plates for welding, and illustrated some typical joints. A survey was made of some examples of welded fabrication which had shown a saving in cost, and had also resulted in much stronger articles than those previously riveted or cast; as examples, jigs, tools, cases and other jobs of interest were illustrated. A slow-motion film of arc welding was shown.

In conclusion, the author said that success in welded construction depended largely upon the initiative of the designer and his ability to break well away from the practice developed essentially for riveting. The economic factors controlling welded fabrication might be classified as intelligent design, sound shop and design room organisation, operators with sound welding knowledge, competent inspectors, and correct welding equipment and electrodes. Just as our forefathers standardised riveting, so must we standardise welding. Standardisation is required for steel plates, steel sections, electrodes, sizes of fillets and types of welds. A new range is required of standard light steel plates and sections. A universal method of showing welding on drawings is also required.

Near Eastern Port Matters

ACCORDING to statistics which have just been published by the Statistique Générale de la Grece (Ministere de l'Economie Nationale), shipping at Greek ports during the month of January, 1933, included the arrival of 252 ships representing 401,671 net register tons against 237 ships and 375,686 n.r.t. arrived during the corresponding period of 1932, and the clearance of 192 ships and 346,290 net register tons against 148 ships and 269,572 n.r.t. The situation of shipping in Greece has considerably improved, and it may be interesting to consider the figures relating to the position of the various foreign flags in Greek waters as a whole:—

	ARRIVALS				CLEARANCES			
	1933		1932		1933		1932	
	No.	N.R.T.	No.	N.R.T.	No.	N.R.T.	No.	N.R.T.
American ...	2	7,160	2	6,230	3	11,475	3	9,562
British ...	19	24,713	19	33,545	12	14,659	12	12,961
Dutch ...	5	5,800	5	7,657	4	4,687	4	6,812
French ...	6	17,982	11	26,675	5	17,309	8	25,320
German ...	9	15,546	6	8,422	11	21,019	5	6,728
Greek ...	60	51,502	70	65,645	30	28,277	15	11,723
Italian ...	87	189,324	62	148,806	82	181,329	55	125,888
Roumanian ...	12	19,530	11	13,869	11	16,434	12	14,681

The British flag has maintained its position in shipping at Greek ports, coming immediately after the Italian flag, which occupies first place. However, it should be noted that the British flag has shown a loss in regard to arrivals while it has shown an increase in connection with clearances.

The largest share of Greek shipping has been concentrated, during January, 1933, in the port of Pireaus, where arrivals included 133 vessels representing 272,825 net register tons against 132 ships and 243,515 n.r.t. (January, 1932), and the clearances of 84 ships and 185,283 net register tons against 83 ships and 163,437 n.r.t. The position of the various flags in the port of Pireaus is given in the following table:—

	ARRIVALS				CLEARANCES			
	1933		1932		1933		1932	
PIREAUS	No.	N.R.T.	No.	N.R.T.	No.	N.R.T.	No.	N.R.T.
American ...	2	7,160	2	6,130	—	—	—	—
British ...	8	13,598	13	24,576	—	—	5	3,479
Dutch ...	1	370	3	5,731	1	1,008	—	—
French ...	6	17,982	9	25,687	5	17,309	8	25,320
German ...	5	8,628	3	2,901	3	11,138	1	1,092
Greek ...	27	33,961	36	37,969	9	12,471	8	4,920
Italian ...	50	123,944	31	79,552	42	94,000	28	67,752
Roumanian ...	9	16,694	11	13,869	8	14,266	11	13,897

The general situation of foreign vessels in Greek waters is also reflected in connection with the position of the various flags in the port of Pireaus.

The situation in Patras, which is the second Greek port in order of importance, has considerably improved during January, 1933, when the arrivals included 16 ships representing 35,175 net register tons against 18 ships and 30,462 n.r.t. (January, 1932), and the clearances included 14 ships representing 48,411 net register tons against 5 ships and 22,110 n.r.t. The position of the various countries in shipping at Patras is shown in the following figures:—

	ARRIVALS				CLEARANCES			
	1933		1932		1933		1932	
PATRAS	No.	N.R.T.	No.	N.R.T.	No.	N.R.T.	No.	N.R.T.
American ..	—	—	—	—	1	4,222	1	3.037
British ...	3	3,783	3	3,015	—	—	1	1,460
Dutch ...	1	1,561	1	895	—	—	1	1,559
French ...	—	—	—	—	—	—	—	—
German ...	1	907	1	2,151	3	3,024	—	—
Greek ...	—	—	—	—	—	—	—	—
Italian ...	6	20,587	4	14,745	8	39,397	2	16,054
Roumanian ...	—	—	—	—	—	—	—	—

The situation of shipping at Salonika, during January, 1933, has shown a slight decrease compared with January, 1932. Arrivals at Salonika included 16 ships representing 21,592 net register tons against 15 ships and 23,181 n.r.t. (January, 1932), and clearances included 14 ships representing 22,580 net register tons against 14 ships representing 24,386 n.r.t. The position of the various flags is as follows:—

	ARRIVALS				CLEARANCES			
	1933		1932		1933		1932	
SALONIKA	No.	N.R.T.	No.	N.RT.	No.	N.R.T.	No.	N.R.T.
American ...	—	—	—	—	1	3,677	1	3,488
British ...	5	5,572	3	3,781	2	2,752	4	6,265
Dutch ...	1	1,031	1	1,031	—	—	—	—
French ...	—	—	—	—	—	—	—	—
German ...	1	919	1	1,685	—	—	—	—
Greek ...	1	2,710	4	5,195	1	2,510	2	4,492
Italian ...	2	5,928	2	6,766	1	3,731	4	6,943
Roumanian ...	2	1,384	—	—	2	1,384	—	—

As a whole, foreign flags have lost ground in shipping at Salonika, both as far as arrivals and clearances are concerned, an exception being the British flag, which has shown an increase in arrivals. In connection with the situation of trade at Salonika, it may be interesting to consider the following figures regarding goods unloaded and loaded there in the course of the past few years:—

	Goods Unloaded Tons	Goods Loaded Tons	Total Tons
1928 ...	640,579	81,707	722,286
1929 ...	726,985	91,782	818,767
1930 ...	641,308	133,538	774,846
1931 ...	639,492	172,383	811,875
1932 ...	586,037	225,504	811,541

The harbour enlargements in the port of Katakolon have just been completed. These works, which had been entrusted to the Ertha Co., of Athens, were started in 1926, and included: (a) strengthening of the outer breakwater and repairing heavy damages which had been made to the breakwater by heavy seas; (b) dredging the inner harbour to a depth varying from 5 to 8 metres; (c) the extension of a mole protecting the inner port from a further increase of silting after the dredging is completed; and (d) the construction of a pier measuring 150 metres in length with a depth of water of 6 metres. The most important of the above mentioned works was the strengthening of the outer breakwater, built by a French company before the war with natural blocks of a very small specific weight and artificial blocks. The storms prevailing on this side of the Greek coast are very strong, owing to the influence of African winds: very often the waves reach a height of 8 metres and a length of 120 metres. Steps had been taken immediately after the war, both by the Greek Government as well as by the local Harbour Board, to improve the situation, but without reaching any result and without being able to fill up the empty parts left in the breakwater after the storms. These circumstances endangered the entrance of ships to the port and also the anchorage proved unsafe and therefore represented a great hindrance to the development of shipping at Katakolon.

The Ertha has had to employ artificial blocks of 180 tons to obtain satisfactory results. The lack of mechanical facilities in Greece to handle blocks of 180 tons enforced the building of floating caissons of a weight of 45 tons, which were towed to the site and then filled. These caissons are consolidated on the exterior side by the sinking of artificial blocks of 50 tons. This system of construction has ensured a safe and satisfactory anchorage in the port of Katakolon. These works involved an expenditure of about 30 million drachmas, and the port now offers anchorage to fully loaded ships of 8,000 tons.

The Harbour Commission (Harbour Board) of the port of Katakolon has, however, worked out a project viewing the connection of the various sections of the port to the railway station, the construction of four warehouses with a capacity of 2,000 tons each, and the building of four 1½-ton electric cranes.

The General Manager of Railways and Ports at Sofia has published statistics concerning shipping at Bulgarian Black Sea ports during January, 1933, and from which it appears that goods unloaded included 10,191 tons against 22,000 tons in December, 1932, and goods loaded included 6,119 tons against 41,100 tons in December, 1932. It appears that steps will be taken to increase the depth of water both at Varna and Burgas.

Ruston-Bucyrus Excavators and London Brick Co. & Forders, Ltd.

The world's largest firm of brick-makers, London Brick Co. and Forders, Ltd., has just purchased two more Ruston-Bucyrus excavators to add to the fleet of 35 Ruston-Bucyrus machines they already possess—these two machines are additional to a Diesel-operated dragline which the same firm ordered three months ago from Ruston-Bucyrus, Ltd.

The two new machines are both electrically-operated draglines of the new type, which Ruston-Bucyrus, Ltd., are manufacturing at Lincoln.

In addition to being the largest firm of brick-makers in the world, London Brick Co. and Forders, Ltd., can claim two other records, as they are employing the largest excavator in the world digging clay for brick-making, and the largest machine in the world for digging in one operation a face of brick clay 80-ft. deep. Both of these machines were specially built by Ruston-Bucyrus, Ltd., to suit the requirements of the London Brick Co. and Forders, Ltd.

The former machine is an electrically-operated shovel weighing over 350 tons, fitted with a bucket of 7½ cubic yards capacity. This machine will shortly be digging sufficient clay for the manufacture of 7,000,000 bricks per week, this output being from one only of their many works.

The second machine, which is excavating the face of clay 80-ft. deep, is a shale cutter. It takes a long even cut from top to bottom of the working face, thus thoroughly mixing the material.

Belfast: Premier Port of Ireland

By M. J. WATKINS

Donegall Quay with Cross-Channel Vessels.

IT is a remarkable fact that, despite universal trade depression and the existence to an unprecedented extent of that dread spectre of the shipowner, the laying-up of tonnage, the Port of Belfast for the year 1931 was in the happy position of being able to record tonnage figures in excess of those of any previous year in its history. As compared with the year 1921, tonnage cleared showed an increase of over 1,000,000 tons. Whilst many factors, economic and otherwise, have contributed to this result, there can be no doubt that the relatively low charges levied by the Harbour Commissioners and the situation, spacious accommodation and magnificent equipment of the port itself—enabling cargoes to be handled and passengers to be landed and embarked with the utmost safety and expedition—have had no little influence in the continued advancement of the trade of the port.

On the subject of charges, it is of interest to note that from 1922 to 1930 reductions in rates on vessels and goods, totalling no less than £500,000, were introduced at various times, whilst at the beginning of 1931 further reductions, estimated to cost £20,000 per annum, were scheduled.

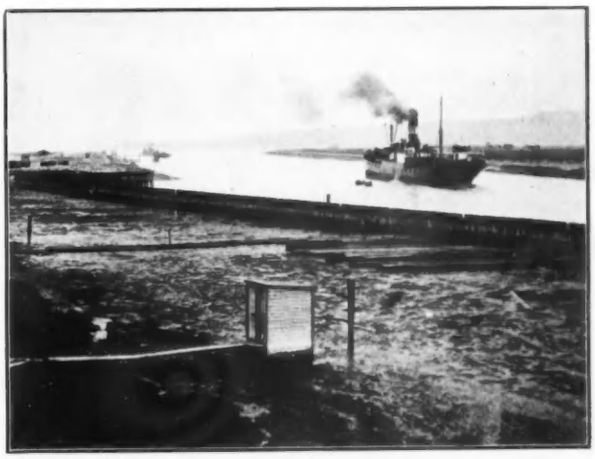
As to the geographical and physical characteristics of the port, it is noteworthy that Belfast Lough, at the head of which the port is located, lies in a position convenient to the great Transatlantic steamship routes and is within easy distance of Scotland and the North of England and Wales. The long capacious lough and deep-water channel affording entrance to the port comprise not only one of the safest and most accessible of harbours, but enable vessels to penetrate so far inland as to lessen rail and road freight charges very considerably. The tidal range being only nine and a half feet at its maximum renders dock gates unnecessary and permits vessels to proceed to and from their berths without experiencing the annoying delays inevitable at ports where docking can only take place at certain states of the tide.

Equipment and Facilities.

The facilities provided by the Commissioners include seven miles of quays affording berths for vessels drawing up to thirty feet; extensive ranges of commodious and well-lighted sheds; accommodation for storing coal, iron, steel, grain, etc., also timber on land or in ponds; railway lines and sidings providing communication with all parts of Ireland; a deep water wharf (500-ft. in length) reserved for oil tankers; cranes ranging in capacity from two to ten tons for ordinary loading and discharging, with special cranes for heavy lifts up to 150 tons.

To those who seek to establish new commercial or industrial undertakings within the ambit of the British tariff wall, a field of exceptional opportunity is afforded by Northern Ireland, where the Government, with a view to the development of industry, is empowered to assist firms satisfying certain conditions to obtain sites of land free of cost. Within the Belfast Harbour Estate itself there are extensive areas of vacant land, which, by virtue of their position on the waterside, with railway communications adjacent, are eminently suitable as sites for the establishment of new undertakings.

There are a number of graving docks of varied capacity, one being the Thompson Graving Dock (887-ft. long), which



The first vessel to enter the new dock system, proceeding seawards after discharge of cargo.

The Port of Belfast—continued

accommodated the s.s. "Britannic" (48,000 tons)—the largest vessel built in the United Kingdom before the Great War and afterwards torpedoed in the Mediterranean whilst serving as a hospital ship—the "Olympic," and those recent triumphs of the shipbuilder's art, the motor vessels "Britannic," "Georgic" and " Reina del Pacifico."

Shed on West Side of New Turning Basin.

The port affords incomparable facilities for shipbuilding in all its branches and for rapid and efficient ship repairs. Two world-famous shipbuilding firms—Messrs. Harland and Wolff, Ltd., and Messrs. Workman, Clark (1928), Ltd.—have their establishments located on the Harbour Estate, and the flags of many nations are proudly borne by vessels which first entered the water off the slips of these renowned firms and set out on their maiden voyages from Belfast Lough.

A Decade of Progress.

It will not be out of place to mention briefly some of the more important improvements which have been carried out and innovations which have been introduced within the Harbour Estate during the past ten years.

The year 1921 saw the completion of the jetty specially erected for oil tankers and the consummation of the project which has provided Belfast with an oil central supply depot, second to none in accessibility, and, at the same time, sufficiently isolated to minimise the risk of damage to other property in the event of fire occurring. In the following years special attention was paid to the development of roads and the provision of bridges on the County Down side of the harbour, including the making of a road through Victoria Park, and the spacious arteries for traffic now existing throughout that area bear witness to the inestimable value of the work then put in train and since perfected.

In the years under review large sums were expended from time to time in modernising the graving docks to meet the requirements of shipbuilders, and the gradual substitution of up-to-date electric cranes for steam cranes with a view to facilitating the discharge of coal cargoes was proceeded with. The crane equipment of the harbour was augmented by the installation of three transporter cranes of the most modern type in one of the cross-Channel sheds, and by putting into commission a hammer-head crane of 150 tons capacity at the Thompson Wharf.

Cranes at Albert Quay, Belfast.

Another section of port equipment to which particular care has been given is that of shed accommodation. Extensive improvements involving *inter alia* the widening of sheds, laying of tramways and concrete tracks, and the installation of electric lighting, have been undertaken and completed.

An improvement of outstanding importance in the internal working of the port was put into operation when the discharge of coal on the County Antrim side of the river was concentrated on the Albert Quay, where is installed a complete equipment of electric cranes for dealing with coal cargoes in the most expeditious manner possible.

To meet the requirements of the shipping companies engaged in the trans-Atlantic passenger trade, which have regular sailings to and from the port, a jetty, with two spacious buildings, equipped with waiting-rooms, accommodation for Customs examinations and medical inspections, etc., was provided.

It can be seen from the foregoing that during the past decade the Commissioners have laboured unceasingly to perfect their shore equipment and accommodation, but in doing so they have by no means been unmindful of their sea communications. Channels, docks and turning basins are under constant supervision to ensure that accumulations of siltage do not occur, and within recent years new and improved navigational lights and fog warning apparatus have been installed for the benefit of mariners using the port. In the year 1922 the Commissioners, as the pilotage authority for Belfast Lough, placed on their pilotage service a steam pilot cutter accommodating 14 pilots.

Development of the Port.

In January, 1930, a scheme for the further development of the port on the County Antrim side of the Harbour Estate, estimated to cost £400,000, was inaugurated. The scheme includes the construction of a dock and turning basin with a lineal quayage of approximately 2,800-ft., fully equipped with sheds, railway lines, etc., designed to accommodate the largest class of trading vessels, with a depth of 30-ft. at ordinary low water; also the cutting of a deep water channel leading direct to the new dock from the Victoria Channel, the main waterway of the harbour.

The Thompson Graving Dock. Length 887-ft., breadth 100-ft.

The project is now near enough completion to permit realisation not only of the value of this great addition to harbour facilities and equipment, which has cleared away an unsightly area of mud banks and stagnant water, but also of the magnificent spectacle which the finished scheme will present. The long, straight, strongly constructed quays, the spacious docking accommodation and the broad channel leading seawards, together form a fine example of modern harbour planning, whilst the extensive flour mill on the dock side, under construction for Messrs. Joseph Rank, Ltd., and the capacious shed 500-ft. in length facing the turning basin (already being utilised for the storage of timber) complete a scene indicative of the potentialities of the site as an area for industrial and portal development.

Some idea of the magnitude of the operations which have brought the scheme of dock development to its present stage is conveyed by the following figures. An area of approximately 250,000 square yards has been dredged to the full designed depth; the 2,000 yards approach channel has been pitched and marked by navigational lights; 11,000 square yards of quays have been constructed, decked with concrete and lighted; foundations of a second shed 530-ft. by 100-ft. approximately, fronting the new dock, are well advanced; roadways rendering the site accessible to all kinds of traffic have been made, and lines connecting with the several railway systems are completed or in the process of construction.

A new era in the life of the port was opened on June 12th, 1932, when the first vessel entered the new turning basin and discharged a cargo of timber.

Financial Stability.

Whilst the Commissioners, charged with the destinies of the port, have shown themselves most progressive in works of development, ever willing to introduce improvements, always seeking to keep ahead of the changing requirements of transport and of shipping, their financial policy has been marked by

The Port of Belfast—continued

a wise conservatism, to which the financial stability of the undertaking bears ample witness. Bold schemes involving large sums have been adopted from time to time, but always with due regard to the ultimate revenues which would result from such capital expenditure and the security of harbour stockholders.

Borrowing powers under a number of Harbour Acts amount in all to £4,290,730. By virtue of these powers sums totalling approximately £2,000,000 have been borrowed, so that the Trust has still at its disposal unexercised borrowing powers amounting to £2,000,000. It is noteworthy also that sinking funds instituted for the redemption of harbour Stock stand at a figure in excess of statutory requirements.

Since 1847 a sum of approximately £3,500,000 has been expended on harbour works of a capital and permanent nature, raising the value of harbour property from £340,070 in 1847 to £3,581,948 at the end of 1931. In addition, of course, very considerable sums have been expended, as necessity dictated, on the provision of plant, machinery, etc. During the same period the harbour revenue has risen from £23,900 to £300,000, notwithstanding the enormous reductions in rates and charges referred to above.

The under-mentioned figures, showing vessels cleared from the Port of Belfast in 1848 and 1931 respectively, give an indication of the immense increase which has taken place in the trade of the port within the past century :—

Year	No.	Tonnage
1848	3,905	506,953
1931	7,290	3,820,251

Bromborough Dock Progress

BROMBOROUGH DOCK has been opened two years and despite the slump in shipping, is being used extensively by coastwise and foreign vessels belonging to many companies. Up to March 18th, nearly 500 vessels, 182 of them foreign with a net registered tonnage of 408,703, and 314 coastwise vessels with a net registered tonnage of 123,053 entered and cleared Bromborough Dock, and cargoes inward and outward handled at the dock reached the impressive aggregate of 410,203 tons.

Bromborough Dock is now well established as a port of call for some of the largest cargo steamers using the port of Liverpool.

In addition to the regular liners, it is a matter of some interest that the dock has accommodated during the whaling close season the two large floating factories owned by the Southern Whaling and Sealing Co.—the "Southern Empress," of 7,599 n.r.t., 525.5-ft. length and 66.5-ft. beam; and the "Southern Princess," of 7,598 n.r.t., 530-ft. length and 66.6-ft. beam. It is the activities of these huge floating factories, receiving the catch from the fleet of whalers away in the Antarctic Octan, that provide the valuable whale oil cargoes brought to the capacious storage tanks installed at Bromborough Dock by a fleet of tank steamers regularly performing their 9,000 miles sea voyage. One steamer, the "Kaia Knudsen," discharged a cargo of 13,000 tons of whale oil.

In addition to the supplies of whale oil from the South Polar regions, there have been big imports of sardine oil from Japan, resin and tallow from North America, copra from the Straits Settlements, palm kernels and palm oil from West Africa, and large consignments of sawn timber from Scandinavian ports have been dealt with. A development has been the provision of a network of coastwise services which now operate weekly or fortnightly to the principal ports of the United Kingdom by such companies as Coast Lines Ltd., J. J. Mack and Sons Ltd., the Ulster Imperial Line, F. T. Everard and R. Gilchrist and Sons.

Progress has been made both with the layout of railway lines and facilities, and with the construction of good roads, giving direct access to the north and south quays and affording excellent facilities for the expeditious despatch and receipt of cargoes. The berths on the south-east and west quays are now rail connected, and double sets of lines have been laid on either side of the transit sheds, linking direct with the main rail system of the country. Extensive Customs transit sheds have been erected, in which commodious lock-ups are provided for dutiable cargoes. This dock is one of the few privately-owned docks to have been granted full sufferance wharf facilities by H.M. Customs and Excise.

During last year 5,946 tons of bunkers were loaded by crane and grab into the vessels at the dock. Concerning cargo-handling appliances, it might be appropriate here to mention that five high-speed 2/5-ton portable electrically driven luffing quay cranes are installed and these are capable of serving all the berths on the south, east and west quays of the dock. Each crane is capable of handling cargo between the ship and shore in the usual manner, and each crane is fitted with a four-rope tvpe grab, which enables loose cargoes to be handled expeditiously. With 2-ton loads the cranes will hoist at 300-ft. a minute, and with 5 tons at 150-ft. a minute. Each crane is fitted with four electric motors for travelling, hoisting, luffing, and slewing. The provision of four motors enables each motion to be obtained separately, or all four simultaneously, and operation can thus be very rapid indeed. There are also electric run-about cranes operating in the transit sheds to ensure the rapid transport of cargo from quay to shed and vice-versa.

Oil storage accommodation is on the right side of the dock and bulk oils are discharged from steamers by shore or ship's pumps through pipe lines into the Tank Park installation. After passing the weighing station, the oil goes through the distributing house to the various tanks, whose capacity is 28,800 tons. Work now in progress includes a modern dockside silo with storage room for 10,000 tons of kernels and miscellaneous bulk imports.

Wonderful progress has been made in a short period, and as there are 600 acres of land available for industrial development, there is every reason to anticipate that when the clouds of industrial depression have rolled away, some of this extensive area will be put to profitable commercial use.

The deep water area of Bromborough dock, 18 acres, and a quayage of 2,900 feet, equipped with 1,020-ft. of transit sheds, is excellently adapted as an ocean port.

Port of Southampton Notes

Statistics for March show Improvement.

March returns of Southampton Docks are decidedly more encouraging than those of recent months. Seven of the twelve headings under which the statistics are grouped reveal increases as compared with the corresponding month of last year, and both tonnage and cargo returns figure among the advances.

Inward the number of vessels was only 209 as against 237 and outward the total was 212 compared with 247. But despite the fall in the number of ships entering or leaving the port the tonnage figures showed a considerable advance

The gross tonnage inward mounted from 987,354 tons to 1,070,535 and outward from 1,028,121 tons to 1,067,394. The increases, therefore, compared with a year ago, were 83,241 tons and 39,273 tons.

The net inward tonnage rose from 531,509 tons to 566,341 tons, an advance of 34,832 tons, while outward the total advanced from 550,827 tons to 566,066, an increase of 15,239.

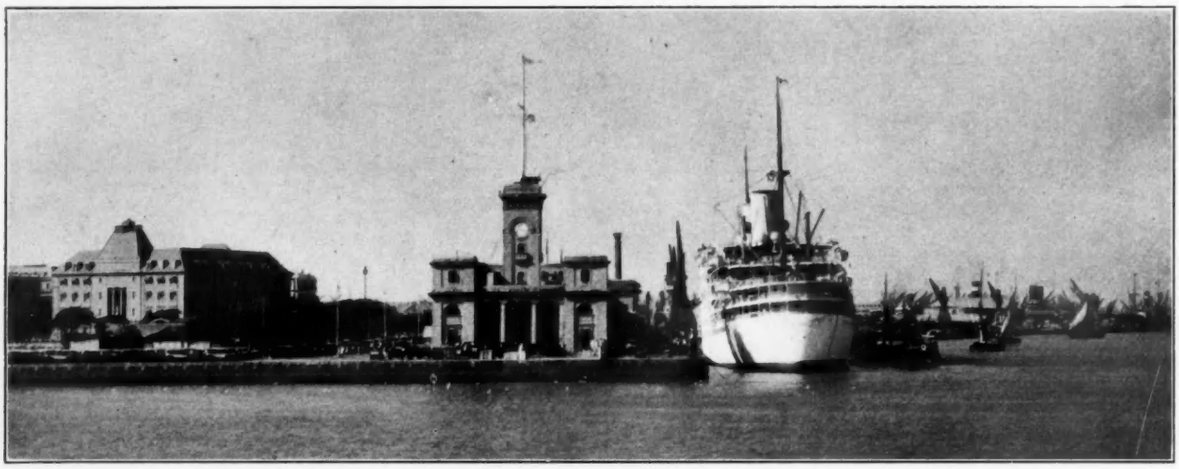
It is a long time since the imports and exports handled at Southampton during any month have both showed an increase. This month, however, such is the case. Imports advanced from 35,408 tons to 41,461 tons, and exports from 27,686 tons to 31,878. The increases were therefore 6,053 tons inward and 4,192 outward.

The volume of passenger traffic, on the other hand, showed a considerable drop, as compared with March of 1932. The decrease inward was comparatively small, the total of 9,515 falling only 173 short of the 9,688 registered in the corresponding month last year. There was a decrease of 1,383 outward, the total dropping from 10,200 to 8,817. As far as troop traffic was concerned there was an advance of 3,315 inward.

First Vessel Discharges at New Berth.

Cargo was discharged for the first time early in April at one of the new berths on the Dock Extension on the Western Shore. The vessel to have this honour was the "Coldstream," which discharged a cargo of 2,300 tons of coal. Some of the new berths have, of course, been used by passenger liners earlier this year.

Bombay Port Trust



The P. and O. R.M.S. "Strathnavar," 22,547 tons, berthing at the Ballard Pier, Bombay. The Port Trust Docks and the P. and O. Offices are in the background.

At a meeting of the Trustees of the Port of Bombay held on 7th March, 1933, the following were the main items of business disposed of:—

The audited accounts for the half year ending 30th September, 1932, were approved for submission to Government.

An estimate for Rs. 6,655 was sanctioned for repairing the godowns at Date Bazaar, Carnac Bunder.

The Board accepted the tender of Mr. Bomanji Dhunjibhoy for the supply of daily labour for cleaning and painting Port Trust plant and vessels during 1933-34.

An amendment of the Docks Scale of Rates was approved, subject to the sanction of Government, introducing a concessional rate of Rs.2 per ton for bulk imports of china clay discharged direct into motor lorries.

* * * *

At a meeting of the Trustees of the Port of Bombay held on 22nd March, 1933, the following were the main items of business disposed of:—

The nomination and election of the following gentlemen to serve as Trustees for two years from 1st April, 1933, were recorded: Nominated by Government—Vice-Admiral Sir Humphrey Walwyn, K.C.S.I., C.B., D.S.O., R.N., Mr. Syed Munawar, Mr. C. W. E. Arbuthnot, C.I.E., Mr. H. K. Kirpalani, I.C.S., Mr. W. W. Nind, Major-General H. Needham, C.B., C.M.G., D.S.O., Mr. M. W. Brayshay and Mr. A. E. Tylden-Pattenson. Elected by the Chamber of Commerce—Mr W. L. Clement, Mr. G. H. Cooke, Mr. T. E. Cunningham, Mr. W. G. Leley and Mr. E. C. Reid. Elected by the Indian Merchants' Chamber—Sir Purshotamdas Thakurdas, Kt., C.I.E., M.B.E., Mr. Lakhmidas Rowiee Tairsee, Mr. Gordhandas Goculdas Morarji, Mr. Ratilal M. Gandhi and Mr. A. D. Shroff. Elected by the Millowners' Association—Mr. A. Geddis. Elected by the Municipal Corporation—Mr. Meyer Nissim and Mr. Hoosenally M. Rahimtoola.

Licences for stevedoring vessels in the Docks and for cleaning, painting and repairing vessels in the Dry Docks were granted for 1933-34.

In order to encourage the export traffic in fresh fruit, an amendment of the Docks scale of rates was approved, subject to the sanction of Government, reducing the dock wharfage charges by approximately 50 per cent.

An expenditure of Rs.90,000 against the relative provision in the Budget Estimates 1933-34 was sanctioned for re-surfacing with asphalt the existing water-bound macadam roads carrying heavy traffic and in urgent need of repairs; the adoption of this improved method of re-surfacing is expected to result in substantial annual savings in future road maintenance expenditure.

The Board considered a note prepared by the Chairman on a reference from Government regarding the proposed levy of a terminal tax by the Bombay Municipality on passengers entering and leaving Bombay. Final consideration was deferred pending consultation with the various passenger lines, coastal and overseas, and the local Chambers of Commerce.

This being the last meeting of the present Board of Trustees, whose tenure of office expires on 31st March, 1933, the Chairman expressed his great appreciation of the assistance he had received from all the Trustees and his regret that certain of them were leaving the Board. He referred in particular to the very useful service rendered to the Administration by Mr. G. L. Winterbotham and Mr. Lalji Naranji, the latter of whom had represented the Indian Merchants for the past ten years, and by Messrs. M. C. Matani and V. D. Govandji. He expressed a hope that the severance of their connection with the Trust would only be temporary.

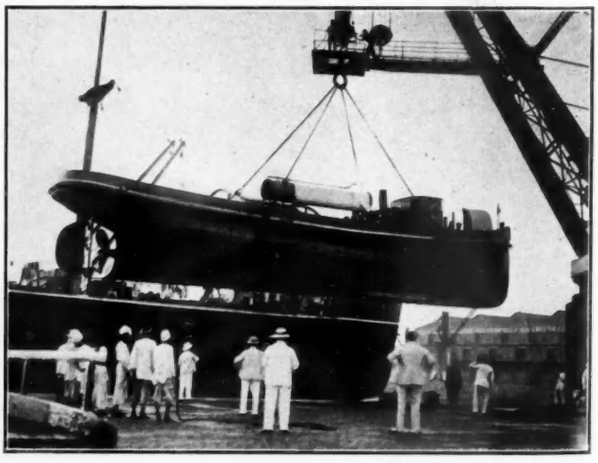
* * * *

At a meeting of the Trustees of the Port of Bombay, held on 5th April, 1933, a Government Notification was recorded sanctioning leave out of India to the chairman, Mr. W. R. S. Sharpe, M.Inst.T., for 4 months and 24 days with effect from 10th April, 1933, and appointing Mr. G. E. Bennett, M.Sc., M.Inst.C.E., chief engineer of the Port Trust, to act as chairman during Mr. Sharpe's absence. Mr. Bennett was elected as the Port Trust representative on the Local Advisory Committees of the G.I.P. and B.B. and C.I. Railways, the Executive Committee of the Bombay Presidency Infant Welfare Society, and the Committee of Management of the Indian Sailors' Home. Subject to the sanction of Government, Mr. A. Hale-White, M.Inst.C.E., deputy chief engineer, was appointed to act as chief engineer *vice* Mr. G. E. Bennett.

The Board decided to extend the 15 per cent. rebate allowed on the rent of the Ryan Grain Market godowns up to 30th September, 1933, in view of the continued depression in the grain and seeds trade.

Subject to the sanction of Government an amendment of the Docks By-laws was approved to provide for the shipment and discharge of non-dangerous petroleum at the Docks Harbour Walls up to a maximum quantity of 50,000 gallons in any one ship subject to certain conditions and precautions.

A reduced scale of initial storing charges at the Docks Duty Paid and Bonded Warehouses and the Apollo Bonded Warehouse was sanctioned, and the rental charge for storage of Egyptian and African cotton in the Bonded Warehouses was reduced. Subject to the sanction of Government, the new scale will be introduced with effect from 1st May, 1933.



A 100-ton Crane in Victoria Dock, Bombay, landing a Steam Tug, ex B.I.S.N. s.s. "Nowshera" for Cambay State. The weight of the lift was 99½ tons

Notes from the North

Stanlow Oil Dock.

THERE is a possibility of a well-known member of the Royal Family visiting the Manchester Ship Canal for the purpose of opening the new Stanlow oil dock, which is now nearing completion. The arrangements for the opening have been placed in the hands of the Hon. Oliver Stanley, Minister of Transport, together with the chairman of the company. The new dock, when completed, will treble the oil loading and unloading capacity of the Ship Canal.

New Pumping Station.

The new pumping station for the Birkenhead graving docks of the Mersey Docks and Harbour Board recently passed its trials. The plant comprises two centrifugal turbine pumps on vertical spindles, each capable of delivering 30,000 gallons per minute against a head of 36-ft.; there are also two relatively small centrifugal pumps in replacement of the old chain pumps for dealing with leakage water. The motors operating the pumps are on an alternating 50-cycle circuit of 400 volts. Alterations had to be made in the arrangement of the masonry culverts on both the suction and discharge sides of the pumps, and one of several resulting economies is that whereas formerly the water contents of the graving docks, which are abstracted from the impounded waters of the Great Float, were discharged into the Corporation Road sewer and thence to the river, they are now returned to their source.

New Dock Bridges.

All the bridges carrying the highway across the docks in the boroughs of Birkenhead and Wallasey have now been replaced by rolling bascule bridges, together with the bridge at the east end of the Egerton Dock, which serves for access to the L.M. and S. and G.W.R. goods yards. The new bridges, five in number, are electrically operated, with hydraulic and alternatively hand gear for use in emergency. The rolling weight of the largest of the bridges, that which spans the 100-ft. passage between the Alfred Dock and the East Float, is well over one thousand tons, of which about three-quarters is ballast, consisting mostly of copper slag concrete. Each bridge has a double roadway, 26-ft. wide between the main girders, with gangways outside for pedestrian traffic. Every precaution has been taken to make the opening and closing operations safe from all points of view, all units in the mechanism and controls being interlocked, and, therefore, subject to use only in designed sequence. Only one and a half minutes are occupied in raising or lowering the bridges. Stability of foundation has been assured by heavy masonry works carried on steel piles. The old cast-iron bridge in Regent Road over the passage between the Collingwood and Stanley Docks, Liverpool, has also been replaced by a double-road bridge similar to the above.

Lower Master Porterage.

Mersey Docks and Harbour Board has reduced its master porters' rates in respect of middlings in bags.

Repairs to Ship Canal Bridge.

Stag Bridge over the Manchester Ship Canal at Warrington is to be closed for three weeks from May 9th, while important repairs are carried out. This has given rise to the contention by residents that while the bridge is closed the Manchester Ship Canal Company should institute a ferry service. The huge framework of steel, weighing about 1,000 tons, works on cast iron rollers, moved by hydraulic power, and swings to the side of the canal to allow vessels to use the waterway. The Ship Canal Company has notified the local authority that the renewal of the rollers to the bridge has become an urgent matter. The contract has been placed with the firm that carried out similar repairs to the swingbridge at Stockton Heath some eight years ago.

Sewage Discharge into Mersey.

An application for a scientific investigation into the effect of the discharge of crude sewage into the Mersey Estuary has been made to the Water Pollution Research Board by Merseyside local authorities, the Mersey Docks and Harbour Board and the other interested bodies. The report of the Research Board for the year makes reference to the deposit of solid matter in the estuary of the Mersey and states:—This deposition has for many years necessitated extensive dredging to preserve a navigable channel. In addition it has been stated that the character of the deposits is such that dredging is frequently difficult. The factors which may effect the nature and amount of the deposits have for a long time been a subject of discussion between the various local interests.

The Board recommends that the proposed investigation should be undertaken by them, the cost to be borne by the bodies making the application. A preliminary programme for the investigation has been drawn up covering work estimated to cost between £15,000 and £20,000.

Proposed Wyre Bridge.

Preesall Council have decided to inform the Garstang Council that they are prepared to attend a meeting to discuss the suggested construction of a Wyre bridge at a point between Fleetwood and St. Michaels.

Port of Liverpool Survey.

Captain F. W. Mace, marine surveyor and water bailiff to the Mersey Docks and Harbour Board, in an address at Liverpool, gave some interesting facts concerning the port of Liverpool. The number of vessels which entered the port of Liverpool last year, he said, was 18,000. Liverpool is one of the few local lighthouse authorities in the country. The unmanned signal stations at Orme's Head, the Rock and the North Wall required attention only once in a year. The illuminant used was dissolved acetylene in steel bottles. They were fitted with a sun valve which put the light out each morning and lit it in the evening. Besides the Bar, Formby and Crosby lightships, the Board had about 160 buoys, most of which are lighted. The Bar lightship threw out a light of 40,000 candle-power. The Board had the largest and most up-to-date dredging plant in the world. The "Leviathan" alone, with her enormous centrifugal pumps, could load herself with 10,000 tons of sand in fifty minutes from a depth of 70-ft. Since the dredgers started, in 1890, they have removed 640 million tons of sand. The limit of improvement of the sea channels by dredgers and other means had been reached, and so the Board had decided on an extension of the training wall system. In an average year, 100,000 foreign-going passengers and 1,000,000 coastwise passengers used the Prince's landing stage. Forty million passengers and 1,500,000 vehicles used the Mersey ferries each year.

Dock Fish Market Scheme Abandoned.

It was mentioned in a recent issue of *The Dock and Harbour Authority* that a proposal has been made for the establishment of a fish market at Liverpool docks. When the matter was first raised by means of a notice of motion in the Liverpool City Council, it was decided that the Markets Manager should consult with the Mersey Docks and Harbour Board and furnish a report to a subsequent meeting. This was done and cold water thrown on the proposal, mainly for the reason that there was little likelihood of success, in view of the excellent facilities that exist at other fishing ports, principally Fleetwood. A new turn was given to the controversy, by the subject being raised by the local Chamber of Commerce which has ascertained that the Mersey Docks and Harbour Board has thoroughly considered all the pros and cons and came to the conclusion that the practicability of the idea on a commercial basis had not much to commend it. An investigation was made of the method of working trawlers at other ports. Furthermore, two important Midland markets disapproved of Liverpool being developed as a centre of distribution. It is a well-known fact that the Liverpool fish trade was dead against the proposal, taking the view that the service of rail-borne fish from Fleetwood, Grimsby, etc., is satisfactory, and it is doubtful if the port of Liverpool could elbow its way through to success, in view of the enormous expenditure that has been incurred at other ports which have laid themselves out to serve the fishing trade.

Ribble Dock Undertaking.

Ribble Corporation, in its estimates for the year 1933-34, has budgeted for £30,000. There has been a considerable difference of opinion as to whether this reduced amount was advisable or not. For several years the Corporation has maintained the amount at £35,000, and it has been insisted that every effort should be made to stabilise the figure. By reducing that provision from £35,000 to £30,000 it means that the Ribble rate will be 1s. 0¼d. as against 1s. 2⅜d. last year. Coun. Ashley Bell told the Preston Town Council that it was satisfactory to know that the Ribble undertaking was doing so well, and it emphasised the favourable position of the undertaking when they had decided it was no longer necessary to provide for a deficiency of £35,000. "It shows," he said, "that in the midst of the world-wide trade depression the port is doing so relatively well that we feel justified in reducing the charge on the rates at a time when other ports are finding it more and more difficult to make their accounts balance."

Notes from the North—continued

Birkenhead's Profitable Ferries.

Birkenhead Ferries have yielded the Corporation a surplus of nearly £18,000 on the past year's working. To this may be added the excess surplus of the previous year, resulting in a rate contribution of £20,350 from this undertaking.

Iron Setts for Mersey Tunnel.

Mersey Tunnel Committee have let the contract for surfacing the roadway with iron setts to Stantin Iron Co., Nottingham, for £41,875. The roadway of the tunnel will be surfaced with square, chilled iron setts, which will take less vertical space than granite setts, and will, it is claimed, be more durable than asphalt. The area to be covered throughout the tunnel and its branches is 50,000 square yards. Acceptance of this tender requires the approval of the Ministry of Transport.

Work is to be started immediately on the Birkenhead entrances to the Mersey Tunnel. In front of the Market Place South entrance there will be a tremendous manœuvring space which will be divided off with island pavements round which the traffic will circulate on its way to the tunnel.

Isle of Man Harbour Works.

The Isle of Man Harbour Commissioners have employed 18 men from the third week in September on the work of strengthening and widening the south side of Victoria Pier, Douglas, and as this work is most urgent, it will be continued until the Thursday before Whit Saturday. This work will probably be continued for another two years before completion. The work on the Red Pier extension has occupied an average of 50 men. The extension work at the Red Pier is being done with 15-ton blocks made in the Battery Pier yard of the Board, and about a third of the 400-ft. extension has been completed. The work commenced in the winter of 1929-30, but it was not until December, 1930, that the job began in earnest. The work will be considerably accelerated as more room is provided for the operations, but even so, it is expected that the extension will take considerably more than the seven years mentioned at the outset. The re-building of the wall of the North Quay between the Market Place and the Swing Bridge has been finished.

The widening of the Victoria Pier in conjunction with the Douglas Corporation's Promenade widening scheme has been left over until the Corporation come to a decision as to the general lay-out of the whole scheme, so that this work may possibly be delayed until the winter of 1934-35.

Isle of Man Appointments.

Mr. Bruce Cowley, of Douglas, and formerly of Port St. Mary, has been appointed by the Isle of Man Harbour Board to the position of assistant harbourmaster at Douglas in succession to Mr. R. H. Cleator, who is now assistant harbourmaster at Port St. Mary and Port Erin. Inspector W. Brew, who has been inspector of Harbour Police since May, 1925, completed his period of service at the end of April.

A Page of History.

One of the almost forgotten episodes in the development of the Ribble Dock undertaking is that a hundred years ago a Scottish inventor offered to make the Ribble deepen its own bed by 20-ft. with " patent hydraulic machinery " in 14 days, at a cost of less than £200. After spending over £200, the Ribble Navigation Company abandoned the dream. This incident is related by Mr. James Barron, M.Inst.C.E., Ribble engineer, in a contribution to a Preston newspaper.

Aden Port Trust

The following are the returns of shipping using the port during the month of February, 1933:—

	No.	Tonnage
Merchant Vessels over 200 tons ...	106	478,833
,, ,, under 200 tons ...	6	972
Government Vessels	7	15,573
Dhows	112	3,957
PERIM.		
Merchant Vessels over 200 tons ...	21	40,226

The total value of imports excluding Government stores was Rs.43,25,000/-, as compared with Rs.41,88,000/- for February, 1932, and of exports Rs.25,96,000/- as compared with Rs.29,38,000/-.

The total value of both imports and exports together was Rs.69,21,000, as compared with Rs.71,26,000/-.

Imports during the month were above those for February, 1932, in the case of gums and resins, seeds, raw skins, sugar, printed or dyed piece goods, unmanufactured and manufactured tobacco; and below in the case of coffee, grain, pulse and floor,

TRADE OF THE PORT.

Article.	Unit	Imports.		Exports.	
		Quantity.	Value Rs.	Quantity.	Value Rs.
Coal	Tons	4,494	1,34,826	0	0
Coffee	Cwts.	6,274	2,14,133	6,453	2,60,043
Grain, Pulse and Flour ...	,,	36,103	1,71,218	20,961	95,538
Gums and Resins	,,	2,969	46,918	3,871	75,026
Hardware	—	0	17,815	0	20,754
Hides, raw	No.	2,247	1,185	975	1,430
Oil, Fuel	Tons	44,793	11,19,825	0	0
,, Kerosene	Gls.	18,800	12,359	8,072	5,620
,, Petrol	,,	27,860	34,165	120	157
Salt	Tons	0	0	22,700	2,33,000
Seeds	Cwts.	4,338	28,054	902	8,267
Skins, raw	No.	375,272	1,75,809	575,551	3,88,636
Sugar	Cwts.	34,774	1,98,313	14,049	81,143
Textiles—					
Piece Goods, Grey	Yds.	4,002,700	5,46,116	2,844,510	3,92,409
,, ,, White	,,	384,387	71,237	170,072	30,320
,, ,, Printed or Dyed ...	,,	818,316	1,84,660	997,133	2,12,588
Twist and Yarn	Lbs.	265,700	1,24,199	283,539	1,28,953
Tobacco, Unmanufactured	,,	391,580	53,706	573,524	83,260
,, Manufactured	,,	48,020	45,181	26,488	17,265
Other Articles	No. of Pkges.	76,034	8,68,970	18,972	3,38,253
Treasure, Private	—	0	2,75,966	0	2,24,000
Total ...	—	—	43,24,655	—	25,96,462

The number of merchant vessels over 200 tons that used the port in February, 1933, was 106, as compared with 112 in the corresponding month last year, and the total tonnage was 478,000 as compared with 484,000.

Excluding coal, salt, fuel oil and Military and Naval stores and transhipment cargo, the total tonnage of imports in the month was 8,400, and exports 4,900, as compared with 7,300 and 4,500 respectively for the corresponding month last year.

hardware, raw hides, grey and white piece goods, twist and yarn, and private treasure.

Exports were above those for February, 1932, in the case of gums and resins, hardware, raw skins, sugar, printed or dyed piece goods, twist and yarn, unmanufactured and manufactured tobacco; and below in the case of coffee, grain, pulse and flour, raw hides, seeds, grey and white piece goods, and private treasure.

Hull and the Humber

Improvements Completed at St. Andrew's Dock, Hull.

THE extensive improvements which have been in progress some time at the St. Andrew's Dock, Hull, for the better accommodation of the fishing industry were completed and made full use of in time for the extra pressure occasioned by the heavy landings of fish during Passion Week. The reconstruction of the new Billingsgate on the south side of the dock after the fire in 1929, when the whole of the buildings were destroyed, having been completed, the London and North Eastern Railway, the owners of the docks undertook the work of bringing the quay on the opposite side up-to-date. Old offices and warehouses in the rear of the landing stage were cleared away, and by putting back the main roadway it has been possible to increase the covered-in accommodation and width of the market by 50 per cent. The quay was thus widened by 30-ft., bringing it up to a width of 90-ft. and uniform with the sister quay, both now being nearly 1,400-ft. long. Concrete buildings have replaced the merchants' wooden offices and there are now 87 bays installed, most of which possess two "boxes" for offices. There have also been provided storage "caves" for fish, and water and electric light are at the disposal of the merchants. A slight rearrangement of office accommodation has facilitated the provision at the top end of No. 1 Quay of special accommodation for halibut, salmon and other imported fish, while traffic congestion has been relieved by the transfer of the Norwegian herring stand to the east end of No. 1 market. Hull has now one of the finest and best equipped Billingsgates in the world. The improvements have been rendered necessary by the constant and enormous growth of the steam trawling industry, which is now responsible for bringing to the port nearly three times the quantity of fish landed just prior to the Great War. This alone is considerably over 200,000 tons annually, in addition to which large quantities of imported fish are received, including herrings from Norway required by the curing houses.

The question of the access of motor lorries to the St. Andrew's Dock for the transport of fish inland by road would appear to have been amicably settled for the present. Following litigation last year, the London and North Eastern Railway terminated the old tenancy agreements and have substituted a new one in which there is a clause restricting the transport of fish from the dock by motor to the Hull area. No definite mileage is stated as constituting " the Hull area," but the agreement has already been signed by all interested parties and is subject to a month's notice on either side. The statutory position at Hull is somewhat different from that at some other fishing ports.

Hull Corporation to Acquire Earle's Shipbuilding Works.

With the ultimate object of providing a large dry dock on the Humber, the Hull Corporation have by 37 votes to 27 votes decided to acquire Earle's Shipbuilding and Engineering Works at Hull, subject to satisfactory terms being arranged with the Vendors. A special committee has been appointed to negotiate with the parties concerned and submit a report as to the terms upon which the shipyard with or without machinery and plant can be purchased. In the course of discussion it was stated that there had been several informal talks with the owners and that the Corporation had obtained from them an offer of the entire concern for £70,000, though it might possibly be got for £60,000. A condition of the sale is that the shipyard shall not again be used for the building of ships. Other work such as drydocking, repairs, the fitting of engines, boilers, etc., will, however, be permissible. Earle's Shipbuilding and Engineering Company was last year acquired by National Shipbuilders' Security, Limited, and under their scheme for the reorganisation of the shipbuilding industry of the United Kingdom was closed as redundant. Hence, the concern is now in the market. The site covers 27 acres with a valuable river frontage and the yard equipment includes a patent slipway capable of hauling up vessels of 3,000 tons, with a second slipway for smaller craft. In addition there are two wet docks, and a fitting-out quay served by a 100-ton electric crane. If the scheme is carried through, the intention of the Corporation is to let the dry dock, etc., to ship repairers and to utilise some part of the land for municipal purposes yet to be determined.

Uncertainty of the Humber Bridge Project.

The future of the Humber Bridge project is uncertain and will depend upon the turn of events and the possibility of a Government grant in aid being available. Owing to the alteration in the financial proposals the Bill failed to comply with Standing Orders and was therefore not sent forward for third reading. It has now been withdrawn and the special committee of the Hull Corporation who promoted it have decided not to take any further steps in the matter of its promotion for the present, but to reconsider the whole question at a future date in the event of the Government's policy in regard to unemployment relief works being altered. Originally, the Government had offered to contribute 75 per cent. of the estimated cost of the proposed road bridge across the Humber, but this was withdrawn later on the advent of the "National" Government, in the interests of the economy of public expenditure. Other plans were made for the raising of capital, but not being a part of the original Bill, the Parliamentary progress came to an unexpected end.

Reduction in Pilotage Charges at the Humber and Goole.

A reduction of 5 per cent. in the pilotage charges of the Humber and Goole has been sanctioned by the Board of Trade, to whom the matter was referred by the interested parties, who had failed to come to an agreement among themselves. The Humber Pilotage Committee recommended a reduction of 10 per cent., and the Chamber of Shipping pressed for 15 per cent., both being unacceptable to the pilots, who considered that they had made their contribution to the relief of shipping by their reduced earnings. At the request of the Chairman of the Inquiry, held in London, a thorough investigation of the costs of running the pilots' cutters is being undertaken with a view of effecting economies. The pilots desired to have abolished the concession allowed to ships in ballast, but the Board of Trade, in deciding that no change should be made for the present, stated that on the whole the Board were reluctant to agree to any proposal making changes in conditions to which a locality has long been accustomed unless there are very strong grounds for alteration. The representations by the Chamber of Shipping on behalf of the shipowners to increase exemptions from compulsory pilotage was withdrawn to receive consideration by the pilotage authority of the Humber. The Chamber also withdrew a proposal to abolish the late booking fee at Hull and Goole, subject to certain conditions.

Imports and Exports at Hull.

The docks at Hull are only moderately busy, but with the near approach of the import season for timber and fruit they may be expected soon to be the scene of great activity. Overseas trade, generally, however, is restricted, owing to the world depression, and shipping especially is being very hard hit and unable to obtain adequate employment. All this means less tonnage entering the docks, with the contingent loss to shipowners, dock authorities, railways and workers. In the first quarter of the year the imports of wheat and kindred cereals at Hull Docks amounted to 386,230 tons, an increase of 14,000 tons over the corresponding period last year. On the other hand, arrivals of oilseeds at 145,000 tons were 45,000 tons down and there was also a decline in sawn wood and pit props. The splendid facilities at the Saltend oil depot, where there are two jetties with pipe lines running into the river, are being increasingly utilised and there is again a substantial advance in the quantity of petroleum imported. Some concern is felt regarding the imports of sawn wood from Russia in the coming season owing to the strained political relations between Great Britain and the Soviet. Humber importers have bought very extensively of Russian wood as usual for delivery between May and November, while altogether Timber Distributors, Ltd., an English company formed to underwrite the Russian supplies, are reported to have disposed of to United Kingdom importers over 400,000 standards, the approximate value, including freightage, being in the region of £4,000,000 sterling. Any prohibition of importation could not fail to have serious effects upon the timber trade and consumers of wood in the building and other trades.

The export of coal so far this year has not come up to the level of twelve months ago, and compared with normal times is a considerable way behind. The total of the exports (foreign) from the Humber ports for the quarter ended March 31st was 802,538 tons, as against 884,645 tons in the corresponding quarter of last year, a decline of 82,107 tons; and from Boston to Lynn 84,742 tons, against 78,583 tons.

Restrictions on Weight of Vehicles using Dock Bridges.

Notices have been posted by the London and North Eastern Railway at their Hull docks restricting the weight of the vehicles passing over the bridges. The maximum varies from 3½ tons to 8 tons of the vehicle when loaded. This new regulation has been very hotly resented by members of the Hull Chamber of Commerce and Shipping, who have addressed a letter to the railway company enquiring "why and under what authority" the notices have been posted. Heavy loads of wool and grain are now transported by road from the King

Hull and the Humber—continued

George and Alexandra Docks, and these being as a rule much in excess of the maximum weights permitted to cross the bridges, a good deal of inconvenience is inevitable. In practice full loads can be taken from one side (the land side) of the docks only. The rights of the company to make the regulations and so hamper the trade of the port are to be contested, though it is stated that they have certain powers and are entitled to exercise them in the direction indicated.

Personal.

Mr. Edward Naylor, chief rail clerk of the Eastern Docks Section of the London and North Eastern Railway at Hull, has retired after a period of 45 years' service. Mr. Naylor began with the old Hull and Barnsley Railway and Dock Company in 1887 at the Alexandra Dock and continued there in various capacities until the opening of King George Dock in June, 1914, when he was transferred to that Dock as chief clerk of the railway department. During the later years he occupied the post of chief rail clerk to the whole of the Eastern Docks, which include King George, Alexandra and Victoria docks and the oil depot at Saltend. To mark his retirement Mr. Naylor was made the recipient of a valuable present by his colleagues.

* * * *

Mr. F. G. Wright, deputy dock master at the Hull Town Docks, has retired after 35 years' service at the docks. During the war years he acted as dock master until the appointment of Capt. Pearse. His early years were spent in the old fishing smacks and the coasting trades.

* * * *

Mr. T. Donaldson, for many years the general manager of the Humber Graving Dock and Engineering Company, has relinquished that position and has been succeeded by Mr. J. Taylor, the company's secretary, who will combine the duties of the two posts.

Immingham Dock Statistics.

During the month of March a total of 89 vessels, representing a net registered tonnage of 99,182, used Immingham Dock, including 18 vessels totalling 20,592 net registered tons using the Western Jetty coaling berth; as compared with March 1932, when a total of 95 vessels, representing 124,593 net registered tons used the port, the Western Jetty being out of commission.

Hit by Depression.

Owing to the continued depression in shipping, the future of Charlton's Engineering and Shiprepairing Company, Ltd., at Grimsby, is uncertain, and for the present no new work is being commenced. The firm was founded in 1853, and was for many years a flourishing concern, employing a large number of men. In 1921 a new slipway costing £100,000 was completed, but unfortunately there has not been sufficient work to maintain the cost, and it is understood that the shipyard may have to close down.

Irish Harbour Matters

Limerick

Meeting of Limerick Harbour Board.

LIMERICK HARBOUR BOARD, at a meeting held on 13th March, accepted the tender of Messrs. Moran and Co., Dublin, at £84,288, for an extension of the dock basin. The other tenders received were:—Messrs. McCaffrey and O'Carroll, Limerick, £84,785; Messrs. P. Molloy, Limerick, £85,315; and Messrs. McNally, Dublin, £84,809 11s.

Alderman J. McInerney proposed that the tender of Messrs. McCaffrey and O'Carroll should be accepted, as they were a local firm, and the difference in price was very small in such a heavy contract.

Mr. J. McCormack seconded the motion, saying that the present-day tendency was to confine public works to local firms.

The Mayor said that the contract had been confined to Free State firms, and if the motion was accepted, then the Board would cut across the principle of competition, which was not desirable.

Alderman P. O'Flynn proposed that the lowest tender, "that of Messrs. Moran and Company," should be accepted.

Mr. M. McMahon, seconding, said that there was too much parochialism in the matter of placing contracts. If that were to develop it would mean that a Limerick firm could not accept a contract outside the city.

Six members voted for accepting Messrs. Moran and Co.'s tender, and five for that of Messrs. McCaffrey and O'Carroll.

The legal formalities in connection with the contract having since been complied with, work will be started at the earliest opportunity. It will give much-needed employment. It is understood that none but Limerick men will be employed on the work.

Dublin

Meeting of Dublin Port and Docks Board.

At a meeting of the Dublin Port and Docks Board, Mr. Walter Baird, chairman, presiding, the Board marked "approved" a letter from the Meteorological Office, London, stating that it was proposed to transfer the gale warning station from Dun Laoghaire to the North Wall. The Engineer and Harbour Master recommended the change.

A letter was received from the Dublin Conservators of Fisheries stating that the Board's dredger was interfering with the best salmon fishing ground in the River Liffey. The Conservators asked that the dredger be removed from this fishing ground during the season.

The letter was referred to the Engineer for report to the Finance Committee.

Dublin Dockyard Wages.

Representatives of the Engineering Trades' Group in the Dublin Trades Union Council, met Messrs. McMillan, Ringsend Dockyard Co., and The Dublin Dockyard Co., to discuss the wages of engineering employees in these firms.

It was agreed that the shipbuilding rate which is lower than the district rate should still apply to shipbuilding work, but that all "up-town" work should be paid for at the district rate.

Annual Dinner of the Institute of Transport.

The Institute of Transport announces that its next dinner will take place at the Connaught Rooms, Great Queen Street, London, W.C.2, on Friday, February 16th, 1934.

Institute of Transport Summer Meeting, 1933.

In substitution of the tour of inspection of Austrian transport undertakings and centres which had reluctantly to be abandoned, a summer meeting will take place on the White Star Liner "Homeric." The party, of which the President of the Institute, Sir David J. Owen, will act as leader and Major F. Bustard, O.B.E. (Member of Council) will be in charge, will leave Southampton on Saturday, June 3rd, and return to that port on June 17th. During the voyage calls will be made at Madeira, Teneriffe, Las Palmas, Tangier and Gibraltar.

On the evening of June 3rd, Sir David Owen will meet the members of the party at an informal reception on board ship. During the outward and return journeys meetings will be held for the presentation and discussion of papers, as follows:—

"The future of road transport," by J. B. Osler, O.B.E. (Member). "Transport advertising," by J. Pike, O.B.E. (Member of Council). "The effect of rationalization and amalgamation on transport undertakings," by D. Ross-Johnson, C.B.E. (Member of Council). "The cruising business," by Major Frank Bustard, O.B.E. (Member of Council).

Some interesting transportation films will also be exhibited in the "Homeric's" cinema theatre.

Morpeth Dock, Birkenhead.

Great Western Railway has nearing completion at Birkenhead a £200,000 scheme involving the creation of a new goods station at Morpeth Dock. In order to render the enterprise possible it was necessary to fill in a dock. There are now warehouses capable of accommodating 150 wagons under cover, sidings where 850 wagons can be berthed, total warehouse accommodation of 72,000 sq. ft., 50,00 sq. ft. of which is waterside accommodation. One thousand tons of traffic are dealt with a day—this apart from coal which runs to 2,000 tons daily.

Scottish Harbour Notes

Clyde Navigation Trust

Visit of Agent-General for Queensland.

IN pursuance of their forward policy of developing trade between Scotland and the Dominions, another important visit to Glasgow, under the auspices of the Clyde Trust, was undertaken last month by the Agent-General for Queensland, Mr. L. H. Pike.

Mr. Pike was accompanied by Colonel J. E. Christoe, representing Queensland Forestry Interests.

The visit was arranged by Mr. Harold M. Ford, the Commercial Manager of the Clyde Trust, and during the three days the visitors were in Glasgow a heavy programme was completed. Arrangements were made whereby the Agent-General and Colonel Christoe interviewed more than forty representative traders and discussed with them the possibilities of greater reciprocal trade between Scotland and Queensland.

In addition, the Lord Provost of Glasgow, Mr. A. B. Swan, who is taking a keen interest in the question of trade development, entertained the visitors to luncheon at the City Chambers, attended by a gathering of business men representative of Glasgow business interests.

The Agent-General and Colonel Christoe were also the guests of the Glasgow Rotary Club.

The visitors also made a tour of inspection of Glasgow's Meat, Fruit and Produce Markets, conferring with traders whom they met regarding the marketing of Australian products in Scotland. Facilities were also provided for meeting representatives of various Glasgow industries with a view to opening up connections in Australia for West of Scotland manufactured products.

Mr. Pike, like his predecessor, Sir Edward Macartney, and other Dominion representatives, has for some time been co-operating with the Commercial Manager of the Clyde Trust in promoting trade between the two countries, and this visit was arranged with the additional purpose of his making the acquaintance of traders interested in the marketing of Australian primary products with a view to new avenues of trade being opened up.

The Lord Provost and Empire Trade.

Speaking at the Luncheon at the City Chambers the Lord Provost said that Mr. Pike and Colonel Christoe had come to Glasgow for serious work, and it was because of that that they welcomed them there that day. While the association between Queensland and the home country was close, it was not just so close as they in Glasgow and Scotland would like it to be. Queensland had certain products which were very necessary to the people of Scotland, and if they could get the Queensland Government and the Agent-General to realise that there was a better way than at present of expanding the export trade of each country it would be to their mutual advantage.

They in Glasgow had a port second to none in the whole world. They had facilities for the discharge of cargo, and they were the distributing centre for a population of almost 6,000,000 people. He did not think that was known to the people of Queensland. The difficulty, he believed, was that the producer in Queensland sent his goods to London, not realising that it was costing him £3 to £6 per ton extra for handling at the London port goods meant for the Clyde instead of sending the goods by direct shipment to Glasgow. They wished to impress that specially upon their friends from Queensland.

Trade Expansion Retarded.

If they took into account that £3 to £6 per ton extra, it would be seen that that created a price in adverse competition with that for goods from other parts of the Empire which were shipped direct to the Clyde. To that extent the Queensland producer was not getting as much money for his goods as he ought to get, and thus expansion of trade was retarded. Queensland had vast natural resources, and there was room for expansion in the production of goods suitable for the markets in this country. Efforts towards such expansion should not be nullified by extra land charges, but that was exactly what was occurring to-day. Colonel Christoe, he said, was particularly interested in the timber trade. That trade had its agents in London, but the agents could not be in the same close touch as a local agent would be with the consumers of timber in the Clyde area. They in Scotland wanted direct shipment from Queensland to the second city of the Empire.

On the other hand, they wanted to say to their friends from Queensland that they in Glasgow, as manufacturers, wished reciprocity carried out as far as possible; they wanted to buy Queensland products, and to sell their manufactures to Queensland. Queensland was an agricultural and mineral country. The Clyde area was a manufacturing centre. It needed Queensland's products, and Queensland needed Clyde products. If they could only get closer co-operation between the two portions of the Empire it would be to their mutual good.

Queensland's Claim.

In his reply, Mr. Pike paid a tribute to Sir Thomas Brisbane, a native of Largs, for the work he had done as a pioneer in the founding of Queensland. At the present time, he said, they had a Scotsman at the head of the Government who was very keen on securing closer co-operation between Scotland and Queensland. Queensland was to a very large extent an agricultural country, and it sent a large percentage of butter, sugar, cheese, etc., to this country. They also had valuable timber exports. Queensland, he said, had every sympathy with Glasgow in her desire to extend her port. The legislators of Queensland had been wise in their generation in that they had seen to the development of their natural harbours and ports.

Imports Compared.

Mr. Pike quoted figures of Australian imports for the six months, July to December, 1932. These showed the following proportions of imports to London, Liverpool and Glasgow.

Meat	London	Liverpool	Glasgow
Hinds and Crops	198,000	132,700	6,300
Beef (lb.)	4,613,200	2,220,200	705,640
Lamb (carcases)	1,892,200	310,000	11,500
Butter (boxes)	1,586,700	52,500	20,200
Cheese (crates)	40,500	345	—
Eggs (long 100's)	1,044,400	156,500	36,000

Room for Improvement.

These figures, Mr. Pike added, indicated that there was room for vast improvement as far as the Glasgow market was concerned. They had in the area served by the Clyde 6,000,000 consumers. That was just about equal to the population of the whole of Australia. Surely there was a great market there. Mr. Ford had opened his eyes that morning by the facts he had put before him, and incidentally he had been greatly struck by the very fine type of business men he found in Glasgow. Two outstanding facts were the necessity to supply that population of 6,000,000 and the demand that existed for Australian products quite apart from sentimental reasons. He had always impressed upon his agents in London that they could not sell articles only because they were Empire produce. They must be marketable.

They had the goods in Queensland. Their butter was second to none in the world, though for certain reasons Danish butter sold extensively in this country. Australian eggs would stand comparison with any other. In short, they in Queensland had the goods, and they sold them as marketable commodities.

Direct Shipments.

As the Lord Provost had said, the demand was there, but they must have direct representation and direct shipments. If he could do anything to assist in securing these, they could rely upon his services. Colonel Christoe was going back to Australia in a few months, and with his assistance, and the assistance of the Queensland Government, they would do what they could to secure direct shipment and representation. They wanted to get somewhere in this matter, and he thanked the Lord Provost for his assistance and for the manner in which he had put the case for Scottish trade. In conclusion, Mr. Pike said that Mr. Ford and the Clyde Trust could rely upon him as one of their warmest supporters in their efforts to develop trade between Australia and Scotland.

Sir Steven Bilsland, Bt., said that in these difficult times no one was doing more than the Lord Provost to show how Glasgow was adapting itself to the necessity of taking advantage of the opportunities of the times. Mr. Pike's statement was one that they would take to heart. He had shown how Queensland and Scotland could, in so many ways, be complementary to each other. Queensland was an agricultural country and we were a manufacturing country, and we wished to see a great two-way stream of traffic between the two countries.

Wood-working Machinery.

Colonel Christoe said the object of his visit was to see that Queensland timber became better known in this country. For years past it had been felt that more might have been done to inform buyers and others interested in this country about it. It might be advisable, he proceeded, for some one in Scotland to go to Australia in some capacity and tell the people what Scotland had to sell to them. They got numerous visits from agents representing England, Japan, Germany, France,

Scottish Harbour Notes—continued

America, and various other countries—countries with which, England excepted, they were not particularly anxious to trade. In Australia they did not know what Scotland could produce except in regard to some of the old-established lines which had been on the market for many years.

For instance, he had not heard before that there was a firm of wood-working machinery makers in Scotland who were turning out a machine for slicing box boards that did away with the wastage that was caused by the sawing. To see that machine, he was told, he would have to go to Aberdeen, and he was going there for that purpose, as he felt that if they could get that machine in Australia it would be well worth the cost of his trip to this country.

They had been selling timber through London agents, but he hoped to appoint agents in Glasgow who would introduce the personal touch and be interested in pushing the sale of Queensland timber. Quite a good business was done in England, and there was no reason why a similar state of affairs should not exist in Scotland.

The Port's Capacity.

Mr. W. F. Roberston, chairman of the Clyde Trust, said the Port of Glasgow was able to tackle anything that might be shipped from any port in the world. The Trust could cope with all the trade that Glasgow and Queensland could carry on. It was his opinion that they were years late in getting together, but he was hopeful that, in the future, Australia and Scotland would be able to co-operate. An extension of the traffic both ways would result in the cheapening of freights.

On departing from Glasgow, in an interview to the press, Mr. Pike said that although he had not had time to make himself thoroughly familiar with all the local conditions, he had been greatly impressed with the great possibilities that existed of expanding the present market for Queensland goods in particular and Australian goods in general. Since his arrival he had interviewed some 40 well-known business representatives, examined the markets and studied the systems of sale and distribution. His definite conclusion was that Glasgow had nothing to be ashamed of in these respects by comparison with other ports in the United Kingdom, either in regard to facilities or the calibre of the men who handled the goods. His visit had given him a much better appreciation of the possibilities of expanding and reciprocal trade between this country and Australia.

The two facts which had appealed to him with the greatest force were the most insistent demand of all traders for direct representation in the Australian market and their equally strong desire for direct supplies from Australia.

He was highly appreciative of the assistance the Clyde Trust had given him, and his predecessor, through their Commercial Manager, not only in connection with this mission but also in the past efforts made in promoting trade between Glasgow and the various States of Australia—an appreciation which he knew was felt by practically every representative of our overseas Dominions.

Value of Personal Contacts.

He was also greatly indebted for the encouragement and assistance he had received from the Lord Provost, whose valuable suggestions would be conveyed to the proper quarter. To those who were looking for an expanding trade in Australia he would say that times were very bad at the moment, but economically Australia had turned the corner, and business men in this country should take a little more initiative in sounding the possibilities of the Australian markets. Business men in Australia were doing much more to push their goods in this country than British manufacturers were doing to sell their goods in Australia. Improved business could be best brought about by direct contact and personal visits.

In conclusion, Mr. Pike said that the case as presented to him by the business community of Glasgow would be transmitted to the Queensland Government and the producers' organisations in Queensland, and he was sure some good results would accrue.

Charges at Bo'ness Dock.

In connection with the provisional order promoted by the London and North-Eastern Railway Company to increase the charges at Bo'ness Dock, a compromise was reported at a recently held meeting of West Lothian County Council. It was stated that an interview had been obtained with the general manager of the railway company in Scotland from which it had been learned that negotiations were in progress with the coal-masters for a settlement inside the maximum scale of charges with the right of appeal either way to the Railway and Canal Commission. It was further reported that the railway company did not intend to increase their charges to the maximum under the provisional order, and that the rates would probably be somewhere near the rate charged at non-railway docks such as at Leith. It was also stated that the railway company—owing to the fact that the volume of trade at Bo'ness Dock would not justify a large expenditure—were not prepared to make extensive improvements.

An interesting report on the same subject was also presented to Bo'ness Town Council by the Burgh Chamberlain. The Chamberlain stated that the provisional order promoted by the London and North-Eastern Railway Company (as ultimately approved) stabilised the present rates but allowed the railway company at any time to approach the Railway and Canal Commissioners for an increase or increases which would not *in cumulo* exceed twenty-five per cent. of the present rates. It was further explained that traders at any of the ports concerned would have the right to appear before the Railway and Canal Commissioners to object to any alterations or, alternatively, to apply at any time for a reduction in the current rates. It was also made clear, however, that Bo'ness Town Council could not at any future date appear in any petition regarding charges before the Commissioners, and that West Lothian County Council could only do so if they had previously obtained the consent of the Commissioners.

Aberdeen Harbour Board.

Aberdeen Harbour Board—on the recommendation of the Harbour Engineer—has agreed that floating fenders should be provided in front of the concrete quay wall at Albert Quay for a length of about 153-ft. It appears that complaints have recently been received of damage sustained by vessels moored at this quay wall, and it is felt that the provision of these floating fenders will prevent direct contact between the stems of the vessels and the masonry face of the quay wall. This matter for some time has been engaging the attention of the Works Committee of the Harbour Board in consultation with the Harbour Engineer. The Board have remitted to a sub-committee to discuss with the London and North Eastern Railway Company the proposed rates for haulage for the current year.

Export Dues at Fraserburgh Harbour.

Application has been made to Fraserburgh Harbour Board by the local fish curers for a reduction on the export dues charged on empty herring barrels. The curers feel that barrels are meantime unfairly taxed in comparison with other articles such as coal and salt, and their contention is that if the present rate is reduced from a penny-three-farthings to one penny the Board will not lose revenue thereby. This matter was fully discussed at a recently-held meeting of the Harbour Board when a recommendation from the Finance Committee that—in view of the present financial position—this matter be reconsidered at the end of the financial year in October next was unanimously carried.

Dundee Harbour Trustees.

A possibility that vast quantities of stone chips may be exported from Dundee during the next three years was revealed in a minute of the Works Committee at a recently-held meeting of Dundee Harbour Trustees. It was stated that Messrs. David Callander (Cunmont Quarries) had 40,000 tons of stones to ship this year yet, and that they had the option of fixing contracts for supplies up to the end of 1936. The communication from the quarry owners stated that they were not fixing any contracts further than the end of this year until they learned that improved facilities for loading were provided. Mr. J. Hannay Thomson (general manager and engineer) reported that the only suitable berth was the one near the outfall of the large sewer at Shed V., Eastern Wharf. He estimated that the scheme would require about 112-ft. of the wharf being raised 4-ft. and strengthened to carry the weight of lorries. The cost of strengthening the wharf and making the ramp would be about £2,000 and the alteration to the shed about £600. The Trustees had asked Messrs. Callander if they would be prepared to give an undertaking to pay one penny per ton in addition to all the other charges levied on all the stones shipped, and Messrs. Callander replied that they would agree to pay the penny per ton provided they always got the berth indicated. The Trustees agreed to the recommendation that the works which had been suggested be carried out.

Leakage in Dock Gates at Dundee.

It appears that the dock gates at King William Dock at Dundee Harbour are meantime giving considerable trouble. On an early tide recently the water level dropped almost three feet, and a careful watch is now being kept to note further escapements. It was also found that the roller of one of the gates had become displaced, and that consequently they could not be shut. These gates—which, it is interesting to note, were installed when this port was opened more than one hundred years ago— have been giving trouble for some time, and it is anticipated that the latest defect discovered will require the services of a diver to make the necessary adjustments.

The Handling and Storing of Grain, with Special Reference to Canadian Methods

By H. H. BROUGHTON, M.I.Mech.E.

(continued from page 188)

In practice pouring is usually carried out in two 10-hour shifts per day, and four crews per shift are employed. Carpenters maintain the forms and make such alterations as may be necessary from time to time; the steel crew places the reinforcing steel in position; the concreting men wheel the concrete in buggies from the hopper on the hoist tower to the work; and the jack men keep the jacks in motion, lifting the forms from ½-in. to ½-in. at a time, the work having to be carried on practically continuously and under close supervision. In some instances the jacks are power-operated from a series of motor-driven lineshafts. At night the forms are illuminated by flood lighting. On account of the many jacks and yokes that are required when the bins are small, it is necessary in some cases to provide a second unobstructed floor, or pouring platform, about 8-ft. 6-in. above the main floor of the moving forms. The pouring platform is used for the placing of concrete, while the main floor is used by the carpenters, steel crew, and jack men. Such double-floor forms are not needed for the construction of simple storage houses.

Examples of elevator buildings constructed by moving forms are a working house and a storage annexe. In each case fixed forms are used for all the concrete construction work up to and including the bin-bottom slabs, and the moving forms are assembled on these slabs. Elementary diagrams of the working house at several different levels are given in Fig. 15a to e. From this it will be noted that the forms are shaped initially in such a way as to enable the bin walls shown in Fig. 15a to be poured.

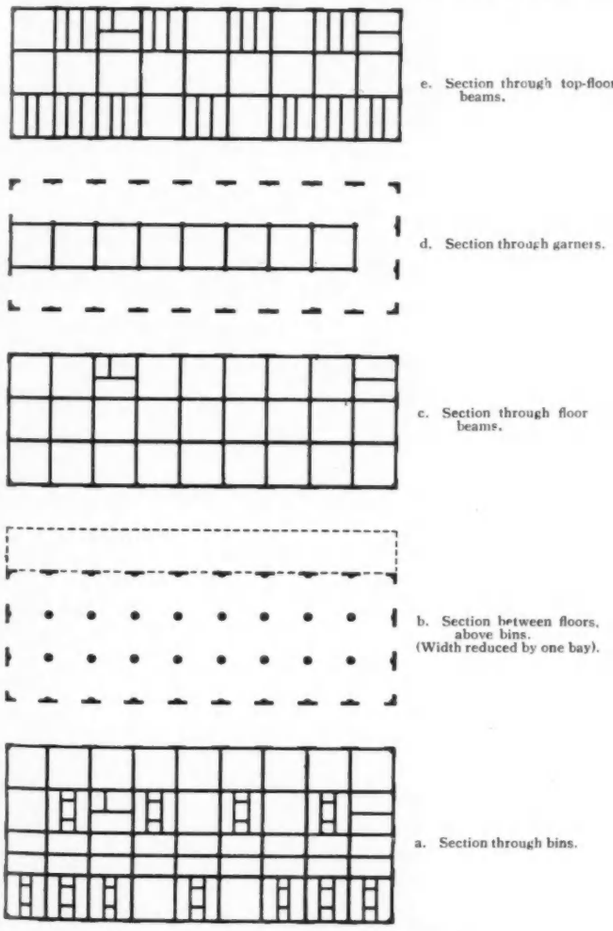

e. Section through top-floor beams.
d. Section through garners.
c. Section through floor beams.
b. Section between floors, above bins. (Width reduced by one bay).
a. Section through bins.

Fig. 15. Sectional Plans of Working House.

As the height of the building increases, certain of the walls are stopped off by inserting barriers in the spaces between the forms. Simultaneously arrangements are made for bracing all jack rods which project from these stopped-off walls because, since these rods support the moving forms, they must of necessity be carried up to the highest elevation to which the forms have to be raised. Fig. 15b shows a typical section between floors from which it will be seen that there is little concrete except that required for the columns and pilasters. Under these conditions most of the spaces between the forms are stopped off. It will be noted that in Fig. 15b the width of the building has been reduced by one bay. The portion of the moving forms shown dotted has been left behind by cutting it adrift

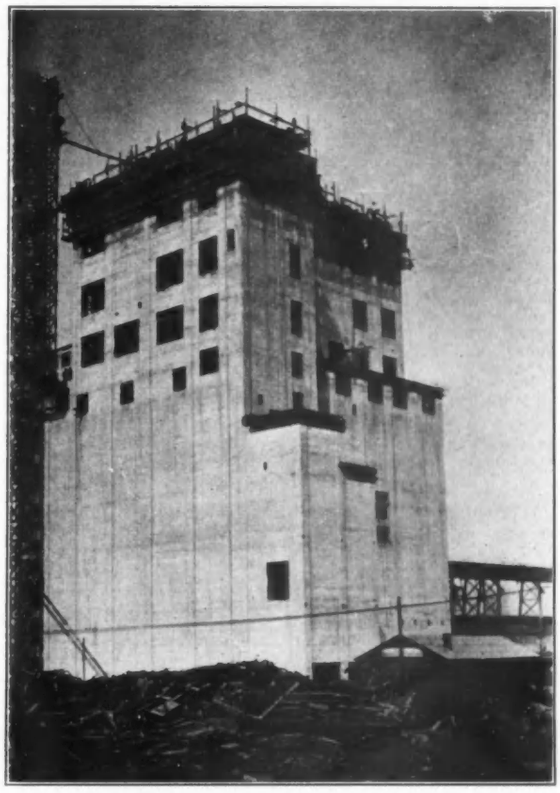


Fig. 16. Working House Building nearing Completion.

on reaching the correct elevation. After such a cut-off, and before pouring is recommenced, the damage to the outside wall of the active portion of the forms is repaired by the carpenters. The part of the form cut away is temporarily secured to the reinforced concrete walls which pass through it; the yokes are removed and, after placing the reinforcing steel in position and arranging for a cornice, the roof slab for the bay is poured on the floor of the form. Before any floor level is reached arrangements are made for pouring the floor beams, Fig. 15c. The barriers used for stopping off are removed and a continuous support is provided for the underside of each beam before pouring begins. This support is inserted at the correct elevation in the space between the forms where the beam occurs, and is carried by timber struts which rest upon one of the beams already poured for the floor below. Before the garners, Fig. 15d, are poured, supports are inserted and the barriers are removed as for the floor beams. The top floor of an elevator carries many heavy loads due to the legs and their associated driving motors and gear units. Extra floor beams, as shown in Fig. 15e, to carry these loads, are readily provided because the moulds required to form them are available. Used when pouring the bins, Fig. 15a, and stopped off on reaching the bin floor, they are brought into action again by removing the barriers and fitting temporary beam-bottom supports. When the roof beams have been poured the forms are temporarily secured to the walls, and the yokes and jacks are removed. A cornice is formed and, after placing the reinforcing in position, the roof slab and cornice are poured direct on the floor of the moving forms. All exposed jack rods between floors, and through window and door openings, are removed by torch, and the several floor slabs are poured on to fixed shuttering for the holding of which provision is made when the floor beams are poured. The column loads

The Handling and Storing of Grain—continued

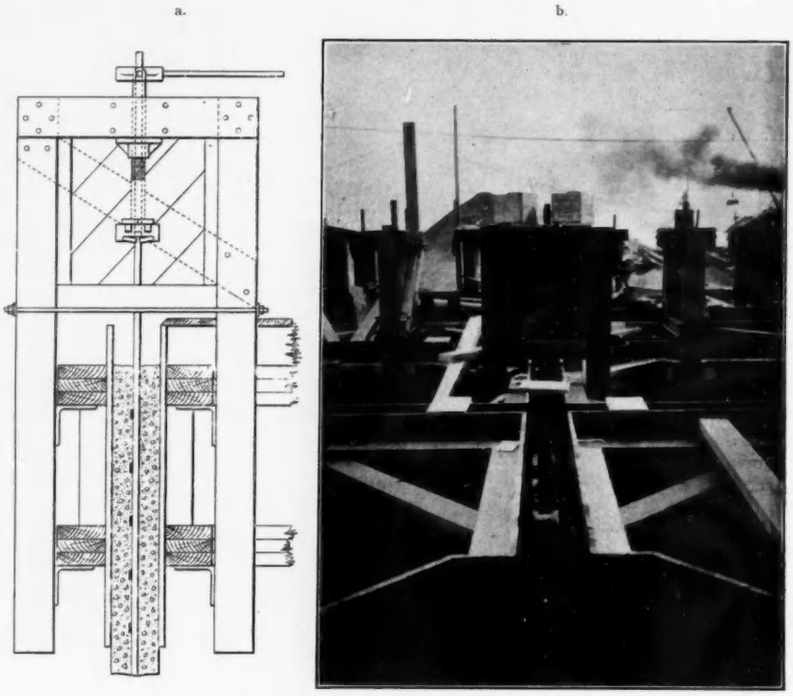


Fig. 17. Yoke, Jack, and Moving Forms.

decrease progressively, floor by floor, as the height is increased, and the size of the columns is reduced by reducing the size of the moulds used to form them. This is readily accomplished and simultaneously the quantity of reinforcing steel is reduced.

A reinforced concrete working house constructed in the manner described is illustrated in Fig. 16. The building, which is 187-ft. high above ground level and 115-ft. by 110-ft. in plan, was poured in 29½ days. Three cut-offs at various levels, shown by portions of the moving forms left behind, are clearly discernible, as are also the jack-rod supports and temporary beam-bottom supports through many of the window openings. The active moving forms on the main portion of the building were within 3-ft. of the roof line when the progress photograph was taken.

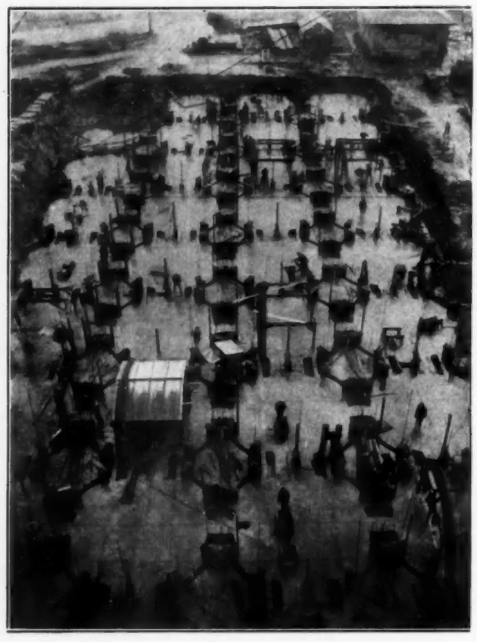


Fig. 18. Aerial View of Moving Forms for Storage House.

In comparison with the foregoing the pouring of the circular bins of a storage house is relatively straightforward. Except in special cases no alterations to the shape of the moving forms are needed. As a rule there are six or eight yokes and jacks per bin. One of these yokes, attached to the moving forms, is illustrated in Fig. 17, and an aerial view showing a typical set of forms into which pouring has just commenced is given in Fig. 18. In the storage house for which these forms were used there are 38 tanks each 26-ft. diameter and 90-ft. deep with 7-in. walls. Pouring was completed to the cupola roof—a height of 115-ft.—in 15 days. Part of the building under construction is shown in Fig. 19. It is of interest to note that "boxed" metal casements for the windows were inserted in the forms at the correct elevations in the basement and cupola and concrete was poured round them.

Typical Elevators

By combining the several receiving, shipping, cleaning and drying facilities described in preceding sections, it is possible to build up from first principles the machinery arrangements that are requisite in elevators of any and every kind for the economical handling and storing of grain. Before noting the leading characteristics of several of these elevators, it is desirable to illustrate what is meant by combining the facilities. For the simultaneous receipt by rail, and shipment by rail and water, the machinery shown diagrammatically in Fig. 20 is required, the arrangement being obtained by super-imposing the receiving and shipping ends shown in Figs. 7 and 9 respectively. Each leg discharges to a separate garner and scale and the elements are mounted one behind the other. In a similar manner machinery for cleaning and drying can be incorporated. Having decided upon the arrangement of the machinery and the capacities required, the floor plans can be made and the elevator buildings designed accordingly. The installations it is proposed to describe are terminal, transfer and port elevators.

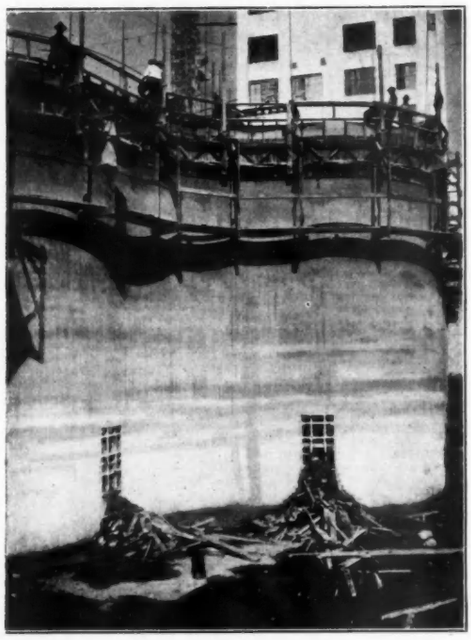


Fig. 19. Part of Storage House under Construction.

Terminal Elevators.

A longitudinal section of a terminal elevator is given in Fig. 21. The plant illustrated is designed to receive by rail and water and, after cleaning and conditioning the grain, to ship by rail and water. Its functions and capacities are:—

(a) To provide storage for 10,000,000 bushels, or 268,000 tons of 60 lb. grain.
(b) To receive by rail at the rate of 60,000 bushels an hour and by water at the rate of 20,000 bushels an hour.
(c) To ship by rail in bulk and sacked at the rate of 75,000 bushels an hour and by water at the rate of 120,000 bushels an hour.
(d) To clean grain at the rate of 54,000 bushels an hour and barley at 8,500 bushels an hour.
(e) To clip oats at the rate of 30,000 bushels an hour.
(f) To bleach oats at the rate of 24,000 bushels an hour.
(g) To dry grain at the rate of 9,000 bushels an hour.

In the complete plant there are fifteen buildings in addition to 10½ miles of railway sidings on which there is room for 1,450

The Handling and Storing of Grain—continued

box cars. Five of the principal buildings, all virtually under one roof, are shown in Fig. 21. The buildings are the track shed, dryer, working house, storage annexe, and river house. Adjoining the latter is the marine tower for unloading grain which arrives at the elevator by water.

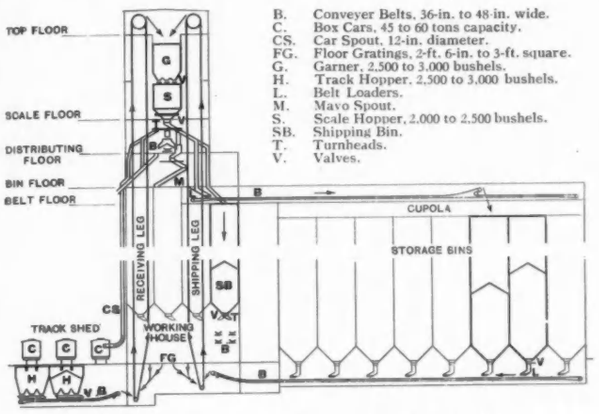


Fig. 20. Combined Receiving and Shipping Facilities.

The working house is a 5- by 18-bay structure having 95 circular bins, each 15-ft. in diameter by 75-ft. deep, in addition to a large number of interspaces. It is equipped with six 15,000-bushel receiving legs, six 20,000-bushel shipping legs, and 26 auxiliary legs of various capacities for the cleaning, drying, and bleaching machinery. On the scale floor of the cupola are eighteen 2,000-bushel scales as well as a number of automatic scales. Distribution of the grain within the house is facilitated by two 42-inch reversible transfer belts on the spouting floor and by a similar belt in the basement. Grain from the scales gravitates to the spouting floor for distribution. It may be sent direct from the scales to box cars in the track shed, to working house or storage bins, and to the river house by belts over the storage bins; or it may be spouted to the cleaning and conditioning machinery for treatment, and then reappear for further distribution. The track shed contains 24 receiving hoppers on four tracks, and there is a fifth track devoted entirely to shipping by rail which provides for one car to be loaded with sacked grain and five cars with bulk grain. One of the receiving tracks can also be used for shipping grain into six cars simultaneously. Located on the ground and spouting floors of the working house is the machinery for cleaning and treatment of wheat, oats and barley. The bleacher equipment is built on the roof of the cupola and the bleached grain is fed to 18-in. screw conveyers which discharge into storage bins reserved for such grain. Designed to operate either on continuous feed or batch the dryer equipment consists of twelve units. The dryer house is built over the track shed and is provided with garners having a combined capacity of 72,000 bushels.

Between the working house and the river house is the storage annexe consisting of 182 main bins and 153 interspace bins. The main bins, which are 21-ft. 11-in. diameter by 105-ft. deep, are arranged 14 by 13 and are pitched at 22-ft. 6-in. centres. In the cupola are twelve 42-in. reversible belts equipped with four-pulley trippers, and in the basement are fourteen 42-inch belts of which twelve are reversible. All bins in the storage are equipped with thermometers so that the grain temperatures can be taken at 5-ft. levels in any bin.

The river house, shown at the extreme right of Fig. 21, is of particular interest. It contains 24 circular and 11 interspace bins. Of the circular bins, which are 21-ft. 11-in. diameter by 95-ft. deep, the twelve nearest the dock serve as shipping bins having a total capacity of 192,000 bushels. Below these are pocket bins. Each shipping bin discharges through a telescopic dock spout to the vessel lying alongside the elevator. In the river house there are six 20,000-bushel legs, each of which is tributary to a 3,000-bushel garner and 2,000-bushel scale. The scale hoppers discharge to the bins through spouts, to the storage house belts within reach, and to the 42-inch transfer belt in the cupola. There is a similar belt in the basement which runs the full length of the house and under the adjacent marine tower. Under the wharf there is a 36-in. belt which receives grain from any of the shipping bins and delivers to a similar belt housed in an elevated gallery parallel to the wharf. The gallery belt, intended primarily for trimming purposes, discharges by means of a tripper through any one of a number of dock spouts into the vessel. The shipping-bin dock spouts are arranged so that they may return grain by means of auxiliary spouts to the receiving legs in the basement, to the shipping gallery belt and to the basement transfer belt. In a similar manner the pocket bins can discharge to the legs and basement belts.

Transfer Elevators.

Fig. 22 shows a section of an elevator intended primarily for the rapid transference of cleaned and conditioned grain from boats to railway box cars. For the handling of Canadian grain, elevators of this kind are provided by the railway companies at the transfer points on Georgian Bay and at several of the lower Lake ports. Large storage capacity is needed to provide for the considerable tonnage of grain which accumulates prior to the closing of Lake navigation and which is forwarded by rail during the winter months to ports on the Atlantic seaboard.

The equipment of a typical transfer elevator consists of three travelling marine towers, a storage house of, perhaps, 6 million bushels capacity, and a small working house. In the latter there are four 15,000-bushel legs, each of which is tributary to a garner and scale. Box cars are loaded by spouts in the manner described earlier. A lofter leg in each of the marine towers discharges weighed grain from the marine leg into a telescopic spout delivering through spaced openings in the roof of the storage house cupola on to either of two reversible belts. The latter, by means of trippers, load the grain on to any of the four 42-inch belts over the storage, which, in addition to feeding the storage bins, also permit of direct transference of grain from boat to box cars. In this case the grain is taken by belt into the working house and, after being weighed in car load lots, is spouted into cars. In the storage house basement there is a system of belts, four of which are arranged to discharge into the boots of the legs in the working house. The legs are also fed through floor gratings and portable spouts from the working house bins.

Other items of equipment are conveyors for transferring grain from the working house to the storage, and a boat spout through which grain can be shipped by means of a belt from the working house to boats or barges lying alongside the elevator. Although not intended to serve as cleaning houses these elevators are, in some instances, provided with one or more receiving separators for cleaning small parcels of grain.

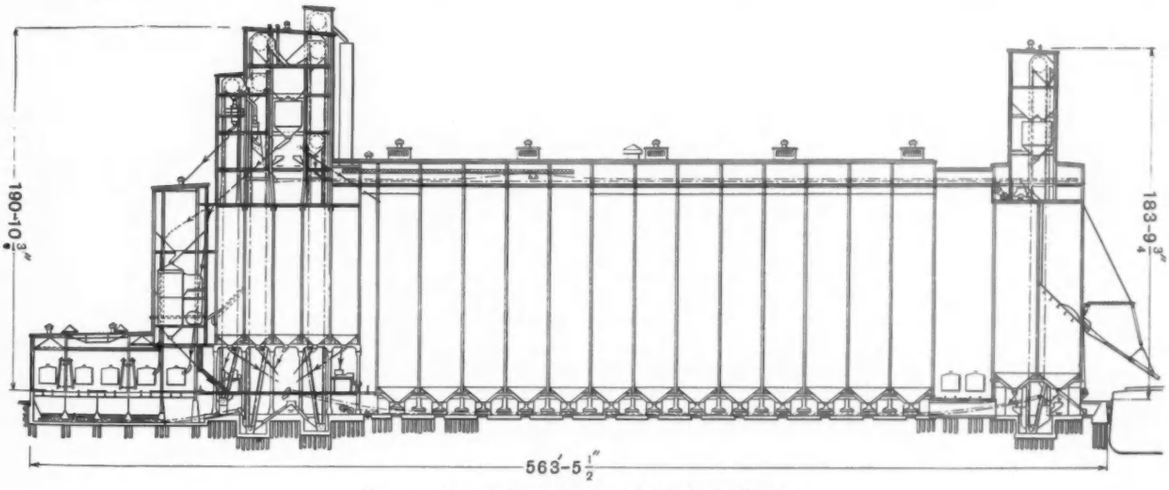


Fig. 21. Longitudinal Section of Terminal Elevator.

The Handling and Storing of Grain—continued

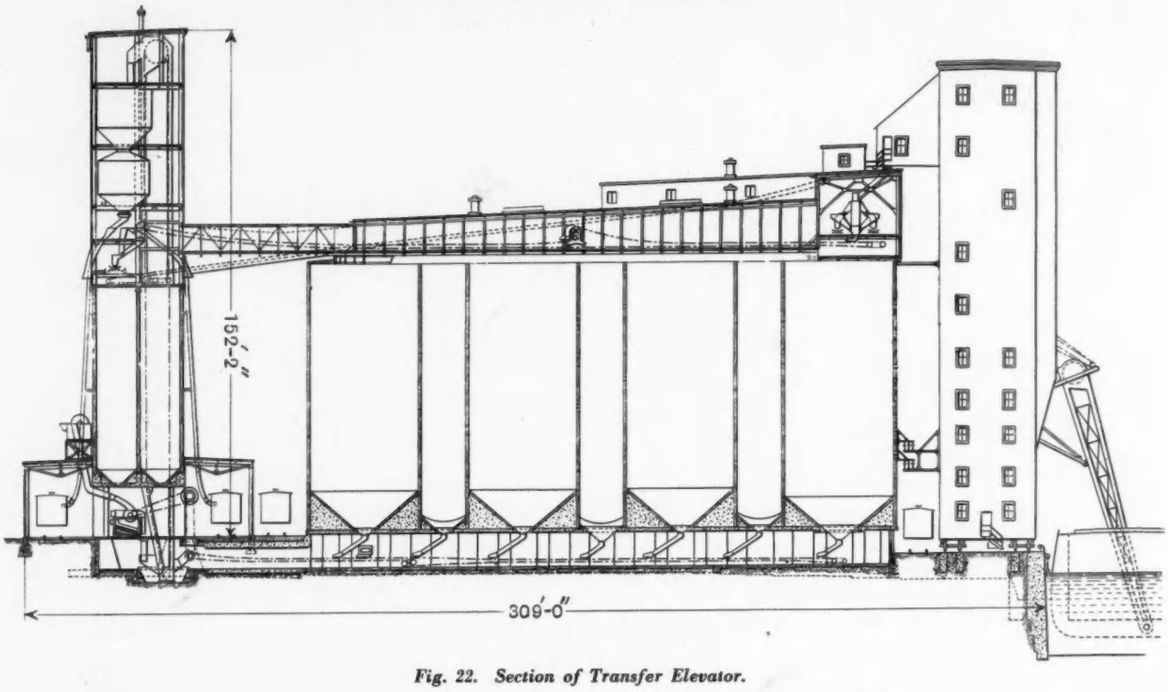


Fig. 22. Section of Transfer Elevator.

Port Elevators.

It has already been stated that while a port elevator may be a transfer house it may equally well be fully equipped with cleaning and conditioning plant similar to that provided in the terminal elevators at the head of the Lakes. Examples of port elevators which serve as transfer houses are the several elevators in the Port of Montreal. Fig. 23 is a view of one of these. The elevator illustrated has facilities for receiving and shipping large quantities of grain both by water and by rail, for storing a considerable tonnage, and for cleaning on a small scale. Examples of cleaning houses at Canadian ports are the elevators at Vancouver. These receive in bulk by rail and ship by water, in bulk for the European market, and in bulk or in sacks for the Orient.

In Fig. 24 is illustrated a port elevator equipped for cleaning and conditioning, and arranged for receiving and shipping by rail and water. The four unloaders in the track shed are together capable of emptying twenty-eight box cars an hour. Each of the four 42-inch receiving belts carries the grain to the boot of a 25,000-bushel receiving leg in the basement of the working house. In addition to these four legs there are seven shipping legs and nine auxiliary legs. The first storey of the working house contains the warehouse separators, the oat clippers, six 42-inch belts under the fifteen shipping bins, and the spouts from the working house bins to the cleaners, belts, and floor gratings respectively. Screenings from the machines are fed into basement hoppers which discharge into pneumatic conveyers leading to the dust house. The working house bins, 97 in number, provide storage for 750,000 bushels of grain.

On the distributing floor of the cupola are thirteen 20-inch Mayo distributing spouts and five telescopic spouts, and on the bin floor there is a disk separator served by a large garner. The spouting floor accommodates the spouting from the scales as well as a 42-inch reversible transfer belt which receives grain from the scale hoppers and discharges to any of the spouts below. In the scale storey there are twelve 2,500-bushel scales and four 800-bushel scales. Each of the large scales is fed from a 3,000-bushel garner immediately above, while the small scales draw from garners of 1,800 bushels capacity. The top floor is occupied by the heads of the twenty legs, each head having its own motor and enclosed gear drive. Access to the several floors is furnished by two passenger lifts, one of which runs from the basement to the top floor and the other from the bin floor to the top floor. Slide poles are provided between the scale and bin floors, and there is a staircase through the bins near the centre of the house. Eight dryer units, each rated at 500 bushels an hour, are installed in the dryer house. The grain is spouted direct from the scales to eight 6,000-bushel garners above the dryers, and is discharged from the latter through fixed spouts to legs which provide for the distribution of the dried grain.

The 3-million bushel storage annexe has 182 circular and 153 interspace bins. The circular bins, arranged 14 by 13, are 15-ft. 4-in. inside diameter by 96-ft. deep and are pitched at 16-ft. centres. Above the bins there are ten 48-inch belts, and

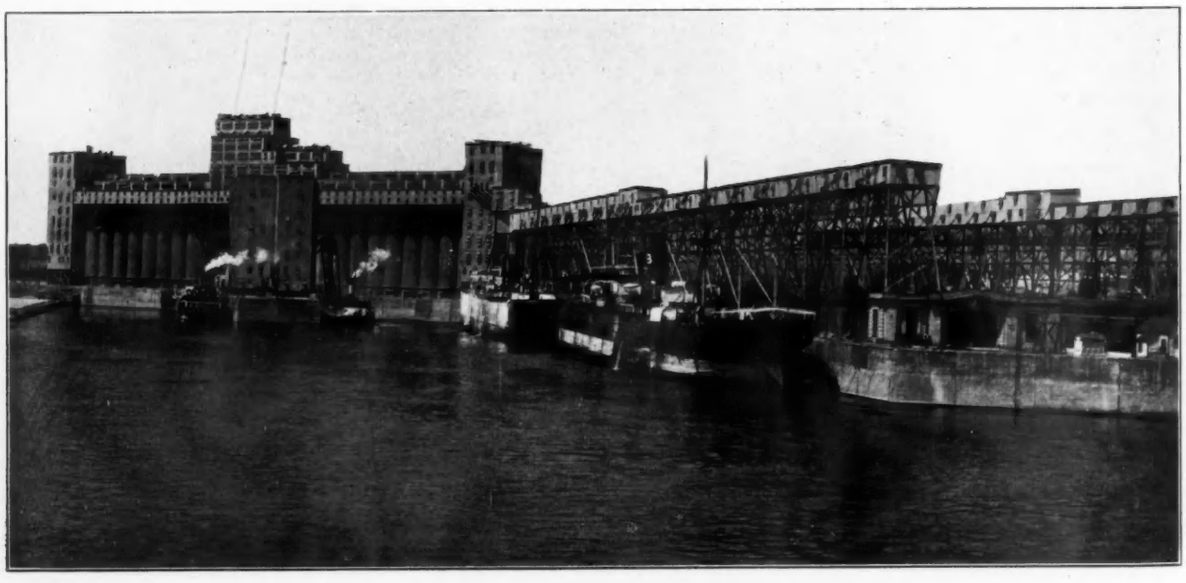


Fig. 23. Port Elevator and Gallery System.

The Handling and Storing of Grain—continued

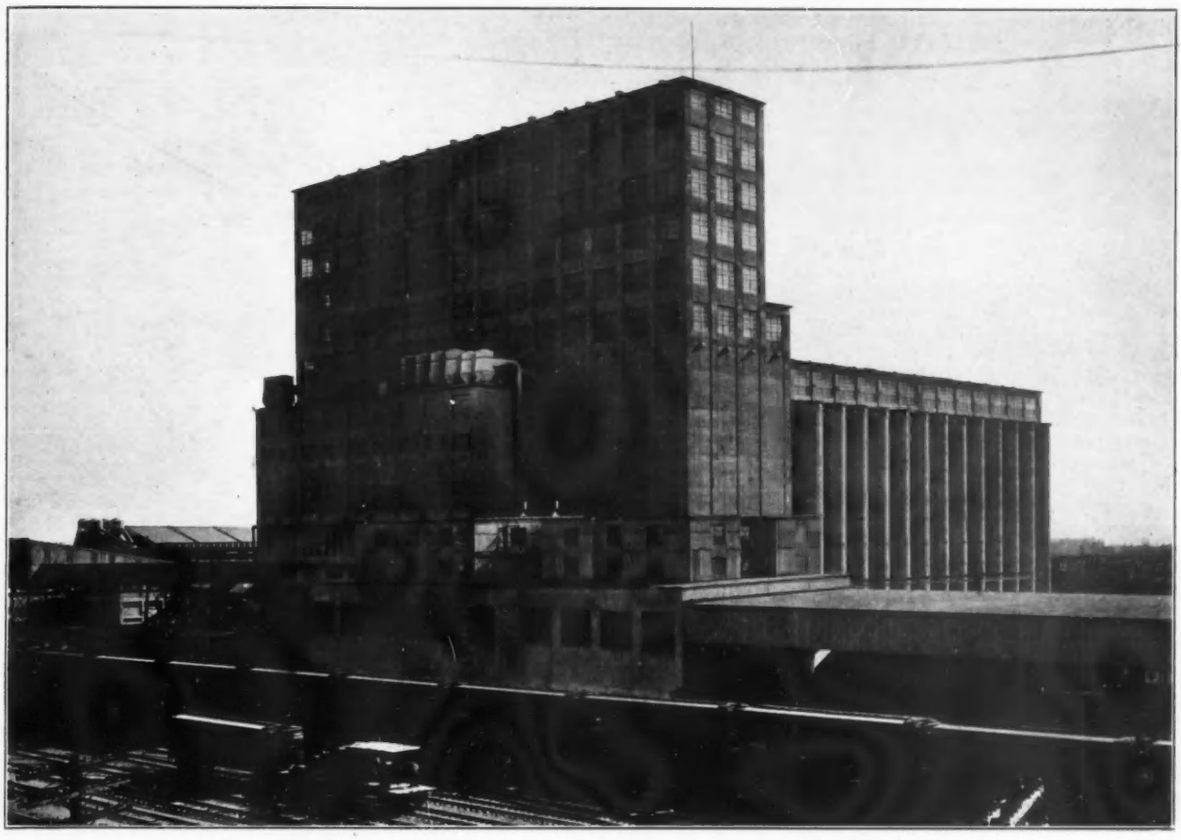


Fig. 24. Typical Modern Elevator.

in the basement seven 42-inch belts convey the grain from storage to the boots of the shipping legs in the working house. A thermometer system is provided for recording the temperature of the grain in the bins.

The dust collecting arrangements, which include a low-pressure system of sweeps for the basements and a vacuum sweeping system with 160 intakes for the other floors, are divided into nine units. The dust house has bin capacity for two car loads of dust. At the bottom of the bin is a screw conveyer and agitator for loading dust in bulk.

Gallery Systems.

To enable vessels to take in grain without interrupting other operations of loading and unloading, it is usual to connect a number of berths to the elevator by an overhead belt conveyer system, or gallery system as it is called. Thus at Montreal, where the system was introduced in 1908, the elevators can deliver grain to any of the 30 or more ocean steamships moored at their regular berths.

The belt galleries shown in Fig. 25 are designed so that six streams of grain leaving the elevator on 42-inch belt conveyers can be loaded into vessels berthed alongside the jetty and pier at a maintained rate of 4,200 tons per hour, or 700 tons per belt per hour. Moreover, water-borne grain can be unloaded from vessels at the end of the grain jetty at the rate of 120 tons per hour, weighed and put into storage, without in any way interfering with the loading operations. The conveyer installation is such that any stream of grain from the elevator can be discharged from any one of the 59 dock spouts, and provision is made to extend the gallery system to another

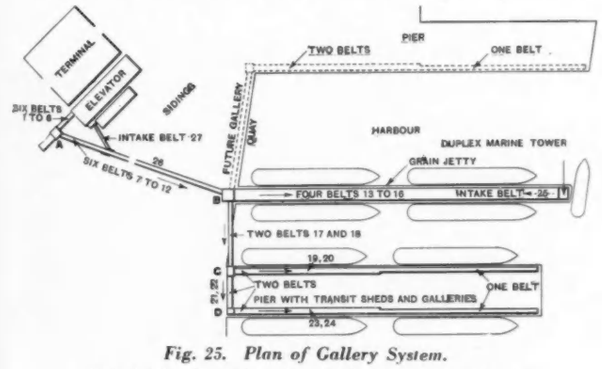


Fig. 25. Plan of Gallery System.
(Note that the elevator is well removed from the harbour front).

pier when the traffic justifies the development. On the grain jetty three streams of grain can be fed simultaneously into a vessel berthed on either side.

Six shipping conveyers under the shipping bins in the elevator, in three tiers of two each, numbered 1 to 6, extend to tower A where the motors and drives are located. These conveyers discharge through fixed spouts and belt loaders to conveyers 7 to 12, also arranged in three tiers of two each, which are housed in the long inclined gallery connecting towers A and B. Conveyers 7 to 12 are driven from motors in tower B and discharge through fixed spouting to six telescopic distributing spouts, each of which is tributary to eight floor openings. Six of these openings are over fixed spouts leading to conveyers 13 to 18 inclusive, and the other two openings are intended for spouts to future conveyers shown dotted in Fig. 25. Four conveyers, 13 to 16, extend from tower B to the end of the grain jetty in one gallery and are driven from tower B. Two conveyers, 17 and 18, extend from tower B to tower C and discharge by means of fixed spouting and belt loaders either to conveyers 19 and 20 extending along the pier, or to conveyers 21 and 22 extending to tower D. The driving motors for conveyers 17 to 20 are located in tower C. Conveyers 21 and 22 discharge to conveyers 23 and 24 extending along the pier in a separate gallery as shown. All four of these conveyers, namely 21 to 24, are driven from tower D. The conveyers along the jetty and pier are carried in galleries 70-ft. above quay level.

There are eight self-propelling two-pulley trippers in the gallery on the jetty and three trippers in each of the galleries on the pier. These discharge through fixed spouting to the telescopic dock spouts spaced at 60-ft. centres apart. Each dock spout has a total length of 70-ft. and is mounted on a boom of 20-ft. radius, arranged to swing back against the gallery when the spout is not in use. It will be understood that instead of the dock spouts being of the fixed type they may be portable. If desired, the galleries may be some distance from the face of the quay.

Look-out stations glazed on three sides are provided in the galleries over the jetty and pier. These stations, of which there are two on each side of the gallery over the jetty and two on each gallery over the pier, contain the signal, telephone, and speaking tube apparatus necessary for the proper working of the system. For the purpose of removing dust from the motors located in the several towers A to D a compressed air system is installed. Each of the six belt loaders in tower A is connected to the main dust collecting system of the elevator.

At the end of the jetty there is a marine tower containing two suction unloaders, each of which is tributary to an auto-

The Handling and Storing of Grain—*continued*

matic scale which discharges to a bucket elevator. The latter spouts to garners or to a 30-inch belt conveyer, numbered 25, carried in a small gallery underneath the main gallery over the jetty to tower B, where it discharges to conveyer 26 at a lower level and in a separate gallery. This conveyer in turn discharges to conveyer 27, also in a separate gallery, terminating in a room on the roof of the track shed adjoining the elevator. Conveyer 27 discharges through a turnhead to either of two spouts, one of which is for loading railway wagons and the other for placing the grain to storage.

Conclusion

In the foregoing, consideration has been given to the machinery and methods used in one of the leading producing countries, and it is possible that doubts may arise as to the feasibility or otherwise of adopting similar methods elsewhere. The machinery and methods described in the paper, modified if necessary to suit local conditions, can be applied in most of the grain-exporting countries. It is the ambition of many of these countries to follow the Canadian plan of handling and storing when world conditions permit of financing on reasonable terms. The position of the importing countries is on an entirely different footing, and it is thought to be advisable to furnish plain answers to the following straightforward questions:—

1. Is such machinery necessary to a wheat-importing country?
2. Are such methods of handling applicable?
3. Is safe storage for a large tonnage desirable or necessary?

In regard to the first two questions, for geographical and other reasons neither the elaborate machinery used nor the methods of handling practised are requisite; but a careful examination of both cannot be other than beneficial. Moreover, the adoption of the Canadian method of silo construction is recommended. In regard to the third question, the provision of a safe storage for the grain supply is as important to a community as is a safe system of banking. To those whose very existence depends on the regular receipt from overseas sources of six-sevenths of their chief food supply the question of safe and adequate storage is one of prime importance.

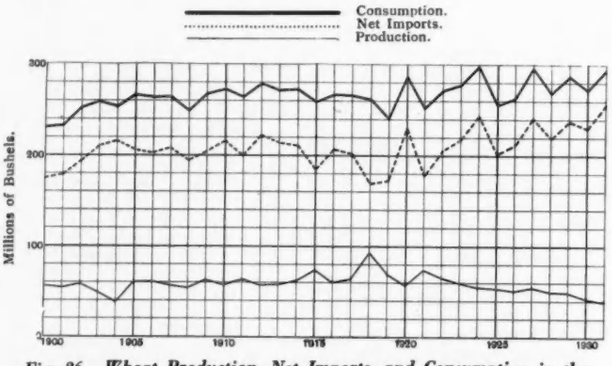


Fig. 26. Wheat Production, Net Imports, and Consumption in the United Kingdom.

The wheat statistics for the United Kingdom are plotted in Fig. 26. To rely, as we do rely under present conditions, on grain stored several thousand miles away is on a par with relying solely on the clouds for a water supply. To ensure a plentiful supply of water, reservoirs are constructed near the centres of consumption. In the case of the grain supply the prudent course to follow would appear to be that of providing safe storage of capacity sufficient for four to six months' normal consumption, or for two to three million tons of wheat. Such storage, spread over not less than eight centres, should be divided into about twenty-four units of various sizes which can be readily determined. Although grain stored in silos can be kept in good condition for long periods, if the plan advocated by the author were adopted the wheat would not remain in store for any length of time. It is of interest to note that the annual cost of safe storage of the capacity stated would not exceed the insignificant sum of 4½d. to 6d. per head of the population, and the benefit derived therefrom would be a measure of security which by no stretch of imagination do we at present enjoy.

In the light of after events the Report of the Royal Commission on Supply of Food in Time of War, published in 1904, makes interesting reading. Both the danger to and the cost of protecting the merchant fleet were greatly underestimated. The post-war increase in the number, size, and radius of action of submarines has introduced factors about which little was known when the Report was issued.

The experts have recently been investigating the desirability or otherwise of giving a bonus or preference to our kinsmen within the Empire on the wheat they send to this country, but in the author's opinion the granting of a bonus should have been conditional on a guaranteed minimum tonnage of wheat being stored in the United Kingdom by the producing country. The expression "safe storage" has been used advisedly to distinguish it from other methods, known as floor and sack storage, which no country in an impoverished world can afford to use. Had the paper been concerned with grain handling in general, it would have been possible to include a number of striking illustrations showing the disastrous results attending the storing of grain in an unscientific manner. It is sufficient to state that no less than eight tons of mice were caught in a non-silo grain store in four days at a time when the people of Britain were rationed for food.

The author desires to acknowledge his indebtedness to all those who have assisted him. Due to the kindness of the Canadian Government, of the Canadian Pacific Railway Company, of Mr. Asa Binns, M.I.Mech.E., of the Port of London Authority, and many others, he has been able to build up and present a composite cinematograph film which illustrates the entire grain movement. All the examples described in this paper are the work of John S. Metcalf Company, Ltd., consulting engineers of Montreal, with whom the author is associated. To Mr. H. Rolph he is under great obligation for suggestions in regard to the paper.

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Appendix II

Typical Belts and Legs.

BELTS.—Grain belts 36, 42, and 48 inches wide are largely used. As a rule they run at a speed of 800-ft. per min., but there is a pronounced tendency to increase the speed to 1,000 or 1,100-ft. per min. The carrying capacities, in bushels per hour, of troughed belts are:—

Width of belt, inches.	Speed of belt, ft. per min. 700	800	900	1,000
	Capacity, bushels per hour.			
36	15,750	18,000	20,250	22,500
42	21,875	25,000	28,125	31,250
48	29,750	34,000	38,250	42,500

Roller and idler spacings seldom exceed 7-ft. and 21-ft. respectively. Belts are concentrated, or troughed, at 45 deg. by means of concentrator rolls pitched at 14-ft. centres, except near the loader where the belt is concentrated to 60 deg. on

The Handling and Storing of Grain—*continued*

each side of the loader. Guide rollers are spaced at 42-ft. centres. Belts are generally 4-ply, but long belts may have to be 5-ply. They are made of 32 oz. duck with $\frac{1}{40}$-inch cover on each side.

LEGS.—Most of the diagrams in the paper show a single feed to the boot and a single discharge at the head. It will be understood, however, that boots may be fed from three or more points in addition to the regular feeding point. Large gratings fixed in the ground floor and connected to the boots either by fixed spouts or by transfer belt, movable loader, tripper, and spouts are indispensable adjuncts when the utmost flexibility is desired. Similarly, instead of a fixed spout connecting the head to the garner immediately below, a turnhead or multiple-way valve may be interposed so as to enable the grain to be discharged into any one of several garners. Except where they pass through the working house bins, the legs are totally enclosed in dust-tight casings fitted with inspection doors at intervals. To the efficient ventilation of all legs much attention has been given in recent years, and it is good practice to terminate each head casing in a large ventilator built on the roof of the cupola. The cast-iron head pulleys, which are 5-ply rubber-covered, are usually 7 or 8-ft. in diameter. On the head shaft of a large leg there may be a load of 15 tons, or more, and with closely spaced bearings a shaft diameter of 9½ to 10 inches is required. With regard to the driving of the head pulleys, at one time rope drives were used to the exclusion of all other methods, but some of these complicated drives have since been converted to gear and, or instead, chain drive. In many new elevators enclosed double-helical gear reducing units have been used throughout with marked success. When the head is gear-driven a flexible coupling should be fitted between the motor and pinion, and such a coupling is desirable between the gear unit and head shaft. If desired, remote-controlled disconnecting clutches may be fitted on the motor spindles. Solenoid brakes are provided to prevent reversal and choking of the legs in case of failure of the supply.

Particulars of a number of typical legs are given in Table 4.

TABLE 4.—Typical Elevator Legs.

	RATING.				
Capacity, bushels, per hour	25,000	20,000	15,000	10,000	7,000
Height of lift, feet ...	243	200	198	223	223
Horse-power	200	140	100	75	50
	BELT.				
Width, inches	46	38	36	22	18
Ply	9	7	7	6	6
Speed, ft. per min. ...	804	700	679	627	627
	BUCKETS.				
Size, inches	22×8	18×8×8	16×8×8	20×7×7	16×7×7
No. of rows	2 s	2 s	2 s	1	1
Pitch, inches	12	12½	11	12	12
	HEAD PULLEY.				
Diameter, inches ...	96	96	96	84	84
Width, inches	48	40	38	24	20
Speed, r.p.m.	32	27·9	27	28·6	28·6
Journals, $d \times l$, inches ...	9½×12	9×12	8½×11	8×10	8×10
Centres, feet	6	5·6	5·6	4	3·7
	BOOT PULLEY.				
Diameter, inches ...	40	24	24	24	24
Take-up, inches ...	14	14	14	14	14

s. Staggered.

Appendix III

Lake Shippers' Clearance Association.

This Association, which is not a trading organization, operates as a clearing house for grain documents, somewhat on the principle of a bank clearing house. When a buyer of grain purchases, say, 100,000 bushels of wheat he does not buy any particular 100,000 bushels stored in a single elevator. He buys 100,000 bushels of wheat of a certain grade, and to complete the transaction the seller has only to deliver warehouse receipts to that amount. He may deliver a dozen different receipts covering wheat stored in a dozen different elevators at the Head of the Lakes and, were it not for the Association, a boat would have to be sent round to the different elevators to take delivery. Through the Association, however, the shipper can in effect trade his warehouse receipts for others, so that his boat can load its entire cargo at one elevator. The importance of this is apparent when it is realized that the saving of a day in the loading of a boat going on a six-day trip means a saving of an amount equal to one-sixth of its gross earnings on the trip. Enormous quantities of grain are handled annually in this manner and the transfer certificates, used by the trade when delivering grain in satisfaction of contracts, have eliminated most of the detail work in the making of deliveries.

Appendix IV

Examples of Construction Costs by Moving Forms.

As the construction of reinforced concrete buildings by means of moving forms may be novel to many, the following particulars in regard to the forms, jacking, and costs may be of interest. The example selected is that of a 2,000,000-bushel elevator consisting of a 400,000-bushel working house and a 1,600,000-bushel storage house, both of which were constructed by means of moving forms.

TABLE 5.—Costs of "Moving Form" Concrete.

	Working House.* 7,740 cu. yards of concrete. Unit Costs.			Storage House.† 9,250 cu. yards of concrete. Unit Costs.		
	Labour	Material	L plus M	Labour	Material	L plus M
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
Cement	0 9	19 10½	20 7½	0 9	20 2	20 11
Sand and gravel ...	0 5	7 3½	7 8½	0 5	7 1½	7 6½
Reinforcing steel ...	10 10	37 2	48 0	3 2	10 7½	13 9½
Concreting plant ...	2 0½	1 11	3 11½	2 0½	1 11	3 11½
Placing concrete ...	13 10½	—	13 10½	7 9	—	7 9
Forms	13 6	3 6	17 0	9 0½	3 3	12 3½
Jacking	21 2½	4 5	25 7	7 5	3 8	11 1
Sundry	3 4	0 4	3 8	2 7	0 3½	2 10½
Cost per cubic yard		...	140 5½			80 2½

* The thickness of the walls varies from 6 in. to 9-in., and averages 7-in.
† The bin walls are 7-in. in thickness.

The above costs do not include overhead expenses, contingencies, or profit.

Appendix V

Elevator Charges.

Elevator charges are fixed annually by the Board of Grain Commissioners. Country elevator tariffs, which are generally regarded as below cost, are $\frac{3}{8}$d. per bushel for grain handled by grade and 1¼d. per bushel for special binning, including 15 days' free storage and insurance against fire.

At the terminal elevator for receiving, elevating, storing, shipping, and insuring straight grade wheat against fire, a charge of ½d. per bushel is made for the first 15 days, after which for each succeeding day or part thereof there is a charge of $\frac{1}{60}$d. per bushel for storage and insurance. On wheat carrying a dockage, after deducting ½ per cent. of the gross weight of the car for waste, a return is made for the balance of the screenings. On all wheat requiring cleaning the charge is:—

Up to 3 per cent. dockage, ⅛d. per bushel.
Above 3 per cent. and up to 5 per cent. dockage, ¼d. per bushel.
Above 5 per cent. and up to 10 per cent. dockage, ½d. per bushel.
Above 10 per cent. dockage, ¾d. per bushel.

Drying charges vary from 1½d. per bushel for tough grain, to 2½d. per bushel for damp or wet grain. On all grain received with no dockage set deductions are made from the gross weight of each car to cover invisible loss and shrinkage in handling. In the case of wheat the allowance is 30 lb. per car. When grain is received in sacks for elevation a charge of 2½d. per sack is made for unsacking. For sacking grain the charge varies from ¾d. to 1½d. per bushel depending on the size of sack, together with ½d. per sack for stencilling. Sacks and twine are either furnished by the shipper or are supplied at his expense. When paper is used in lining cars the charge is 16s. 8d. per car. In unloading cars fitted with bulkheads there is a charge of 20s. 10d. per bulkhead.

Weser Inland River Shipping in February, 1933

Shipping traffic on the Weser during February was blocked by ice during the first days; however, it was soon possible to recommence—on the stretch Minden-Bremen from the 4th on—fully and unhindered. Due to the temporary thaw, water conditions were more favourable than in the previous month.

Goods traffic through the Bremen Weser Lock amounted to 87,800 tons in February, of which 61,700 tons fell to downstream traffic and 26,100 tons upstream. The corresponding figures in January were 67,600 tons, of which 47,600 tons downstream and 20,000 tons upstream. In both directions together goods traffic amounted to 155,400 tons. That is 2,300 tons, or 1½ per cent. more than in the previous year. Downstream the quantity, with 109,300 tons, was 2,400 tons, or 2 per cent. larger; upstream it was approximately the same as last year. In downstream traffic gravel and stones and piece goods transport increased considerably; potash and salt transport, on the other hand, decreased not inconsiderably. Upstream grain and flour decreased considerably, while timber, piece goods and other goods increased considerably.

Book Review

Teubert's " Inland Waterways: A Handbook for all Interested Persons " (Die Binnenschiffahrt, Ein Hanbuch Fur Alle Beteiligten), by Oscar Teubert; a completely re-written and expanded second edition by Dr. Eng. Wilhelm Teubert, assisted by Dr. Werner Teubert, with 377 illustrations, 6 large maps of waterways, a full index, with 976 pages of text, published by Wilhelm Englemann, Leipzig, 1932.

The saying that no man ever dies who writes a book or has a son is exemplified two ways in this very remarkable second edition of the standard work on " Inland Waterways," by Oscar Teubert. The original work has been the classical text book on the subject for a great many years. It has now been completely re-worked by his two sons, both having previously won recognition in this field of studies of shipping matters. Wilhelm Teubert is the author of numerous works on this subject, especially " A Cross Section of World Shipping," 1929, the result of a world study tour, a monumental and useful work. He is a professor of the engineering of marine structures at the University of Mannheim.

The elder Teubert, who wrote the original handbook, had a distinguished career, and had received the honorary titles of Ober-und Geheimer Baurat (Superior Privy Counsellor), and was Strombaudirektor der Markischen Wasserstrassen, a.D. (Superintendent of the Waterways of the Mark Brandenburg). It will readily be seen that the elder Teubert, in the original work, had based his lectures and writings upon a very thorough and long experience in the practical administration of several of Europe's most important inland waterways. The elder Teubert was preparing a second edition of his monumental work of 1912 when he died, in 1916, with the manuscript finished and corrected, and part of the book printed. His sons took up the pen where he laid it down, resulting in this present complete handbook on every phase of inland navigation.

The work covers the economic, technical, operating, political and legal phases of the very complicated questions involved in inland waterways navigation. The original work was not hastily written. Oscar Teubert devoted ten years of painstaking labour to a commitment to paper of his years of experience in inland waterways construction and operation.

The new book is printed in a very clear face of type. The type used is Roman face, rather than the old Gothic face used for many years in Germany, and as a result any technical person familiar with the general subject-matter, and having even a rudimentary knowledge of German, can read all of the drawings and most of the text with comparative ease. The numerous illustrations are clear in every detail and can be read easily. Any of the many structural drawings could be used as working drawings for constructions, due to their detail and completeness.

The book is divided into eight divisions, each with several sections.

FIRST DIVISION.

Section 1 discusses the relationship of inland waterways to the complete economic picture, the relationship of transportation to national economy, the relationship of inland navigation to land transportation, and the relationship of inland waterways to contemporaneous transportation problems.

Section 2 is an historical study of inland waterways up to the year 1870, including inland waterways of antiquity, inland waterways of the Middle Ages, including the invention of lock chambers in A.D. 1438.

Section 3 covers inland navigation from the invention of the lock to the invention and development of the steamship.

Section 4 discusses the Shipping Acts or Sections of the Congress of Vienna, and the development of inland waterways after the invention of the steamship to 1870.

SECOND DIVISION.

This division pertains to the development of inland waterways since 1870 in Germany and in other countries, including the United States and Canada.

THIRD DIVISION.

In this division the construction of inland waterways and their operation is discussed.

The first section covers natural waterways and current movements in streams.

The second section discusses canals of various kinds, prisms, profiles, location and water supply.

Third section pertains to locks and lifting mechanisms, including various types of locks, also large lifts, lock gates, valves, the filling and emptying of locks, and flights of locks.

Fourth section discusses systems of inland waterways and the standardisation of vessel measurements.

Fifth section covers inland waterway ports: 1st, various types; 2nd, general lay-out; 3rd, transfer equipment, loading and unloading; 4th, inland harbour administration and operation.

FOURTH DIVISION.

Section 1: Types of vessels for inland waterways.
Section 2: Flat carriers without motive power (towed barges).
Section 3: Self-propelling vessels.

These chapters are fully illustrated with drawings and photographs and give extremely valuable details for naval architects constructing craft for inland waterways.

Section 4: Railway and floating dry docks, self-propelling barges.

Section 5: The present status of inland navigation, containing a discussion of the influence of the world war and elaborate statistics of the nature and volume of inland waterway activities.

FIFTH DIVISION.

This division deals with the propulsion of vessels and the resistance of vessels moving in confined prisms in canals, the results of elaborate experiments in resistance, both residual and frictional. Steering in quiet water and in water with currents is discussed. Also various methods of towing and various phenomena of towing, as well as different types in still water and in currents.

SIXTH DIVISION.

This is a discussion of the business of operating vessels on inland waterways, as an enterprise conducted for profit.

Section 1: The business of operating the individual vessel, including the business of towing.
Section 2: Large scale and small scale operations.
Section 3: Cost accounting systems.
Section 4: Enfreightment, with special reference to the building up or solicitation of freight movements, the payments for towing, the proceeds from operation, comparisons of joint water-rail rates and water and rail rates.

SEVENTH DIVISION.

This division refers to the relationship of inland waterways to the State, which has to do primarily with the relationship of German waterways to the German Government. Discussions also cover the regulation of inland waterways by the State, the methods of financing inland waterways and the participation of the State in inland waterways, with special reference to the State-owned railways and the inland waterways improved at public expense.

EIGHTH DIVISION.

The volume of inland navigation, including statistics of inland navigation, the increase in traffic from the viewpoint of volume. The third section of this division contains a discussion of inland navigation study according to various waterway systems, the inland waterways traffic, with regard to certain large centres of activity. In Section 5 the inland waterways in other countries are discussed.

The work is by all odds the most complete treatise ever published upon this extremely technical subject of inland waterways. The authors deserve the highest praise, not alone for the pious labour of completing their father's unfinished second edition, but in giving the great public interested in inland waterways this exhaustive and thorough treatise upon the subject. There seems to be no angle of the subject which has not been discussed clearly and thoroughly. The work should be at the elbow of every interested person, as a starting point for future study and application of these inland navigation problems to the particular problem at hand to be solved by the engineer in any locality. It is obvious that only this very sketchy indication of the extent and content of nearly a thousand pages can be covered within the confines of the book review columns available.

R. S. MACELWEE, B.S., M.A., Ph.D.,
Consulting Engineer on Ports and Terminals.

Completion of the Kustenkanal.

In a few days the official subsidy regarding the construction of the final stretch of the Kustenkanal will be granted. This concerns the construction of the still missing 24.0 kilometres to the mouth of the Ems, including the works. The most important piece of work is the clearing of the canal bed, the construction of the abutments of the bridge for the crossing of the railway line Munster-Emden, and road construction. The tenders offered by various firms run from approximately 1,300,000 Rm., to the highest tender of approximately 1,600,000 Rm. Together with these works it has also now been possible to obtain from the State of Prussia the lock construction in the Borgerwald Canal, the canal connection with the town of Papenburg. Work has already commenced.

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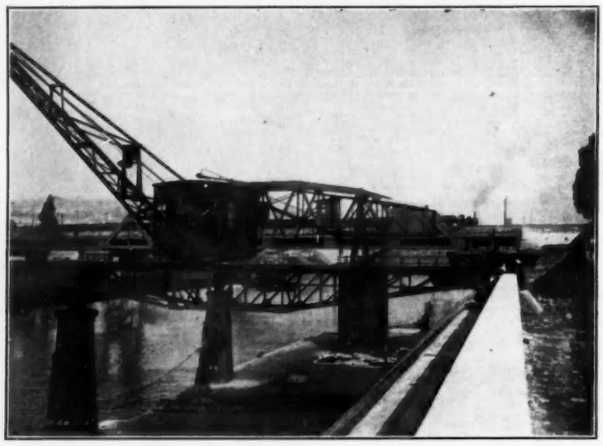
Italian Harbour Affairs

ACCORDING to statistics which have just been published by the Consorzio Autonomo del Porto di Genova, shipping at that port during the first quarter of 1933 included the following figures:—

	ARRIVALS			CLEARANCES		
	No.	N.R.T.	Goods Tons	No.	N.R.T.	Goods Tons
March ...	463	891,973	474,896	487	968,898	92,207
February ...	406	767,036	441,313	399	744,165	94,947
January ...	399	830,343	471,872	391	810,004	63,622
Total 1933 ...	1,268	2,489,352	1,388,081	1,277	2,523,067	250,776
,, 1932 ...	1,149	2,342,754	1,230,124	1,191	2,421,801	214,776
,, 1931 ...	1,236	2,563,284	1,495,663	1,269	2,555,803	219,953



Port of Rome: Railway Terminal and New Electric Cranes.

Despite the general depression of shipping, trade at Genoa has been maintained satisfactorily during the first quarter of 1933, and a general increase is shown in respect to the corresponding period of 1932. The figures for March are higher than those for January, especially in regard to goods exported. In order to obtain an idea of the development of trade in the port of Genoa it is interesting to go into the question of the main goods imported during the period under review, and which are summarized in the following figures:

	MARCH		FEBRUARY		JANUARY	
	1933 Tons	1932 Tons	1933 Tons	1932 Tons	1933 Tons	1932 Tons
Coal	179,115	187,882	193,560	120,268	215,210	193,755
Cereals ...	47,553	80,290	33,205	59,790	28,761	46,434
Cotton ...	16,396	18,144	17,451	13,779	17,711	24,570
Wool	7,791	8,556	4,790	5 981	8,137	6,199
Skins	2,745	1,306	1,884	1,458	2,100	2,248
Phosphates ...	6,903	3,974	18,697	1,582	14,442	1,800
Oil	47,696	29,406	27,077	26,480	35,234	39,635
Frozen Meat ...	682	1,756	503	1,427	969	1,354
Lumber ...	10,954	6,284	16,787	10,665	19,345	9,454
Other Goods ...	155,061	109,911	127,359	120,929	129,963	94,807
Total ...	474,896	447,509	441,313	362,359	471,872	420,256

If the monthly figures are compared year by year it will be seen that the largest increase has occurred during the month of February. During the first two months of 1933, progress in maritime imports at Genoa has been characterised by larger arrivals of coal, textiles, phosphates and lumber, while during March increases have been shown in general cargo, oil, lumber, phosphates, etc., while the imports of coal, textiles, etc., have shown a decline. These figures clearly show that progress in shipping at Genoa is not connected exclusively with the coal trade. The increase in the imports of oil and lumber have been caused particularly by larger arrivals of these commodities from South Russia. Also the transit trade from Switzerland through Genoa has increased particularly as far as the exports to Japan are concerned.

In connection with the activity of the Genoese drydocks, it may be interesting to note that according to statistics which have just been published by the S.A. Ente Bacini of Genoa, tonnage drydocked during the first quarter of 1933 included the following figures:—

	MARCH		FEBRUARY		JANUARY	
	No.	Gross Tons	No.	Gross Tons	No.	Gross Tons
1933 ...	44	193,194	28	116,779	43	294,177
1932 ...	44	223,321	44	209,405	53	254,492

The tonnage will, however, increase in the course of the next few weeks, as there is the prospect of another overhaul of the " Rex," the 52,000 gross tons liner of the Italia Line.

It may be added that the construction of two additional electric cranes along dry dock No. 3 is well forward, and that further improvements are still under consideration.

At the last meeting of the Executive Committee of the Consorzio Autonomo del Porto it was decided to grant financial help to the builders and operators of an establishment for testing the condition of cotton imported, and this building will be erected in the port of Genoa.

The cost of works carried out at Italian ports from January 1st, 1923, to December 31st, 1932, has reached 1,580 million lire. Now it appears that further works have been decided upon, and among them may be mentioned the following:—

1.—The extension of the outer breakwater sheltering the port of Portovecchio Toscano, which has been entrusted to the Societá Anonima per i lavori del Porto di Genova and involving an expense of 5,700,000 lire.

2.—A new dock is to be built in the port of Naples, along the Mergellina Riviera, and the construction has been entrusted to the Sindacato Italiano Costruzioni Appalti Marittimi. A credit of 2,000,000 lire has been allowed for this purpose.

3.—The repair of the breakwaters and piers at Castellammare and Torre Annunziata.

4.—The construction of a viaduct in the port of Messina, where about 200 metres of new quayage have just been inaugurated. Such construction involves an expenditure of 4 million lire.

5.—In the port of Catania it has been decided to enlarge the Central Pier and the Southern Mole, while new rails are being laid down in the port. The Government has allowed a credit of one million lire for this purpose.

6.—A new breakwater having a length of about 100 metres is being built in the port of Savona to ensure the safety of ships anchored in the inner port. The cost of such construction has been estimated to reach 2 million lire.

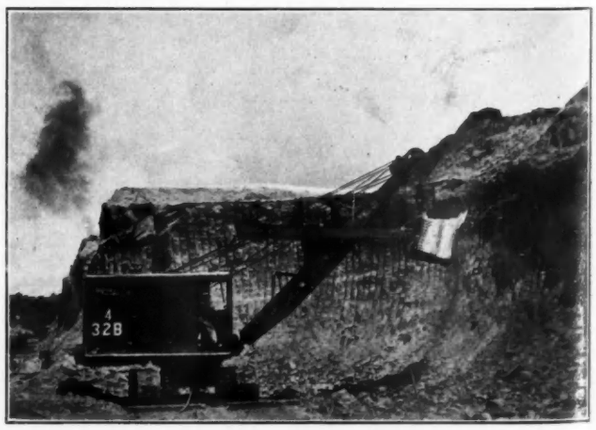
7.—In the port of La Spezia, where in the course of 1932, the Officine di Savigliano S.A. Turin have placed further electric coal elevators, another sheltering pier is being built, which is also to be used for commercial operations. The Government has made an allowance of 5,200,000 lire to carry out the construction at La Spezia; and finally—

8.—A credit of about 4 million lire has been allotted to carry out harbour improvements on the Island of Capri in the Gulf of Naples.

Ribble Navigation: Retirement and New Appointments.

Mr. James Barron, the engineer and general superintendent of the Ribble Navigation and Preston Dock Undertaking, owned by the Corporation of Preston, retires on superannuation this month, and at their meeting on the 27th April, the Preston Town Council made the following appointments, to take effect as and from the 26th May, 1933:—Mr. John George Merriweather, M.Inst.T., the present dock superintendent and general traffic manager, to be general superintendent; Mr. Alfred Hartley Howarth, A.M.Inst.C.E., to be engineer. Mr. Howarth is the son of Sir Alfred Howarth, Town Clerk of Preston, and has acted as assistant engineer since 1922.

Ruston-Bucyrus, Ltd.



The illustration shows a 1 cubic yard electrically operated Ruston-Bucyrus shovel at work on the new Civil Aerodrome, Singapore. The exceptionally hard ground which the excavator has to dig is clearly indicated. The machine is one of the five 32-B models supplied to the Crown Agents for that purpose in August, 1932.